The Builder.

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Public Works in Spain.

COMMISSION was nominated by the Spanish Government to draw up a report upon the state of public works in Spain, for the purpose of laying the information thus gathered together before the world, as it is represented by the great Parisian *Exposition*. This report is now before us, and we find it confirms the generally received impression of the rapid progress made by the Spaniards since the commencement of this century. The commissioners excuse themselves for not having made the account so full as it might have been, by pleading the insufficiency of means at their disposal, the short period of time allowed them, and the unfavourable season of the year for the production of photographs of public works. The survey of modern Spanish enterprise forwarded by them to Paris, consists of four parts; in the first being an "*album graphique*," of the most notable works; the second, a collection of photographs of the same; the third, a collection of models; and the fourth, the report under notice. When we recollect that in 1820 there was no school of engineers in Spain, and that the public works there were undertaken by empirics without scientific knowledge; and at the same time bear in mind the comparatively small sums that could be devoted to constructional improvements, we must allow that Spain has done tolerably well, especially in some branches. The maritime lighting department, consisting of a hundred and forty-nine lighthouses, appears to be, perhaps, the most noticeable perfection. After this come the roads, the railways, and the ports in the succession we have given them; to which the commissioners add, with special pride, mention of the canal of Isabel II., by the means of which Madrid is provided with water, and of the Canal d'Urgel, works of merit and importance, projected and directed by Spanish engineers. The roads, in 1864, consisted of lengths amounting to 14,926 kil., of which the road known as Las Cabrillas, with the magnificent bridge over the Cabriel, and those between Sahagun and Rivadesella and Granada and Motril, are the most noticeable. The railways have a total of 7,018,587 kilomètres. The ports at which most has been done are Barcelona, Tarragona, Valencia, Cartagena, and Almeria. Besides these lines of communication, navigation, and irrigation, and the ports mentioned, with their lighthouses, quays, and other maritime constructions, there is the department of civil constructions, comprising all the edifices serving for public instruction, for the administration of justice and charity, such as schools, libraries, prisons, hospitals, theatres, &c., in a word, all works executed with the funds of the Treasury or with those of the provinces and communes. All public works, generally, are under the control of the minister of public works (*Ministerio de Fomento*); some exceptional instances, however, being amenable to the minister of finance (*Hacienda*) and the minister of the interior (*Gobernacion*). The minister of public works has for his staff the corps of *Ingénieurs des Ponts et Chaussées*, supplemented by that of the *Conducteurs* or *Ayundantes de obras públicas*. When a construction is simply for the benefit of a province or municipality the cost is generally defrayed by the place interested, the exceptions being cases in which the Treasury affords a grant to assist the local improvers. The acceptance of such a grant brings the supervision of the works into the department of the Government, *Ministerio de Fomento*. There are two modes of execution recognised. The Government department either takes a work in hand or permits a company to do so, allowing it, as compensation for their expenditure, the profits of the undertaking for a certain number of years. This *concession* system is that which is most frequently adopted, as the administration is not always furnished with the large sums required for the prosecution of costly works. The minister of public works enjoys the assistance of two consulting corps. The first of these councils (*Junta Consultiva*) is composed of inspectors-general of the corps of engineers; and the second (*La Commission des Phares*) is presided over by an inspector-general of the first class, aided by several inspectors of the second class of the *Corps des Ponts et Chaussées*, and by some of the superior officers of the marine department.

The Spanish school of engineers was definitely founded in 1834, and the *Corps des Ingénieurs* was created in 1835. The latter is a corporation numbering 340 individuals: 5 inspector-generals of the first-class, 15 of the second-class; 30 engineers-in-chief the first-class, 50 of the second; 80 ordinary engineers of the first-class, 120 of the second; 15 assistant-engineers of the first-class and 25 of the second. In the details of the service these engineers are aided by the subalterns (*ayundantes y sobrestantes*) before mentioned. The surface of the country upon which they have to carry on their operations presents many difficulties. Its contour has been likened to the trunk of a cone, rising in platforms, the summit of which, if carried up, would be high in the air above Madrid; but this simile has also been objected to as conveying an idea of greater regularity than really exists. It enables us, however, to form a rough conception of the difficulties to be encountered and vanquished by the corps in question, as they lay down their long lines of communication on the vast mountainous promontory. There are thirty-three railways in Spain, if we may include four large tramways in the list, twenty-two of which are in the hands of railway companies. A general survey of these has been made, and a project of rectification made out, in which districts that are now beyond railway communication may be brought into it, and centres of production and consumption linked together by the same accommodation. These proposed additions are nearly all very short lengths, varying from one to three or four hundred kilomètres, the whole not amounting to more than 3,331 kilom. Owing to the mountainous nature of the country, bridges and tunnels follow each other in some sections in rapid succession. Within about 10 kilomètres on the line between Cordone and Malaga, for instance, there are twelve tunnels and six large bridges, spreading heights and spanning gorges and fissures as sombre as those of the Alpine chain. The second section of the Saragossa and Barcelona line, which extends from Cervera to Tarrasa, has sixteen tunnels, eleven bridges, and a viaduct of eighteen arches in a run of 94 kilomètres.

The commission of *phares* was created in 1842, at the suggestion of the engineers forming the *Direction Générale des Chemins, des Canaux, et des Ports*. It has under its charge all the business relating to lighting and signalling in Spain, in the islands of Baléares and the Canaries, and on the coasts of Africa. The most remarkable of the lighthouses are those at Santander, La Corogne, Cadiz, Almeria, Murcia, Tarragona, Barcelona, Ibiza, Majorca, and Minorca, which vary in height from 30 mètres to 61 mètres. Of these some are fixed lights and others revolving. Thus a first-class light can be either revolving, with an eclipse from minute to minute, or fixed; second-class lights permit of the same choice; whilst fourth and fifth class lights are generally longer in their revolutions, the scintillations being at intervals of three minutes' duration. Nine of the most important towers are represented by careful models in the Exposition. The materials employed in their construction are nearly always stone for the towers and for the staircases within, though, in some few instances, the latter are made of iron. To preserve the stone from the action of the salt in the sea-water a coating of oil-paint is used. Three lighthouses in Spain differ from this construction. They are those at Fangar Point, Baña Point, and the Isle of Buda. Following what is known as the Mitchel system, they are built of iron on a foundation of piles. For the sake of economy, say the Commissioners, these were made in England, but from the designs and under the superintendence of Spanish engineers. They were lighted for the first time in 1864.

Spanish legislation has divided the laws concerning Spanish waters into seven chapters. The first relates to the waters of the sea, and the second to the waters of the earth; then follow their beds and currents, their uses, concessions, and general supervision, all of which are full of sub-divisions, such as navigation, loading and unloading of cargoes, fisheries, the fabrication of salt, &c. The terrestrial waters are either pluvial, living or running, stagnant, or subterranean, and the chapter relating to them deals with all these varieties. The *alimentation* of towns, as the French have it, is, of course, an important branch of the subject. The most remarkable work executed in Spain is the canal of Isabel II., constructed for the water supply of Madrid, as before mentioned. It follows the ancient Roman method, that is to say, the water is conveyed on aqueducts built of masonry. Its length is 76 kilomètres, and its tranverse section is 2·80 m. in height by 2·15 m. in width. Along its course are several important works of constructional interest, as the Prise du Ponton de la Oliva, thirty-one tunnels, thirty-two lengths of aqueducts, four grand syphons for the passage of four valleys, and the depôt of water of the Champs des Gardes. The subterranean galleries used in the distribution of the water complete this great undertaking of the Government engineers. Thirty-five fountains and 3,000 *bouches* for watering the roads or extinguishing fires, are supplied with water from this source, besides the liberal allowance accorded to every resident in the capital city. The Government engineers have also projected and carried out water supply works at Xérès de la Frontéra and at Valence; and have authorized others at Oviédo, Cordova, Valladolid, Cadiz, Lorca, Barcelona, Albaceti, and other centres of populations. Sixteen models of aqueducts, bridges, and machinery connected with marine engineering illustrate these works in the Exposition.

The Spanish commissioners inform us that it was not until 1862 that the laws relating to civil constructions were properly framed and digested. This department is now under the auspices of the corps of engineers likewise, and the Ministerio de Fomento is the commander-in-chief of it. Of the short period between this re-organization and the creation of the commission no mention is made; but before 1862 three import-

ant works have been taken in hand by the corps in question, viz., the aggrandizement and embellishment of Barcelona, the improvement and embellishment of the Puerta del Sol, Madrid, and plans for the aggrandizement of the same city generally. The project for the improvement of Barcelona was confided especially to Mr. Ildefonso Cerdá. Mr. Lucio del Valle was entrusted with the embellishment of the Puerta del Sol,—the Trafalgar-square, if we may say so, of Madrid; and the general improvement of the city, already completed in various quarters, is superintended by Mr. Inspector Carlos Maria de Castro. Among other works recently accomplished are a Survey of Madrid, gardens and monuments in the Plaza del Oriente, the St. Louis fountain, the elevation and distribution of the waters of the Queen's Fountain, a viaduct in Segovia-street, and the lengthening of Bailen-street, all in Madrid, besides projects for two new quarters and further distributions of water in the same city, and the improvement of Bilbao.

In a quaint geographical work, entitled, "A Short Way to Know the World," published at the commencement of the last century, it is written,—

"Madrid, the capital of Spain, is a flourishing city, as big, as the Spaniards pretend, as Paris, and of note for the royal seat and supreme courts, in possession at present of Philip the V.; but for the most part ill-built and the streets ill-lay'd; but if there is ever a good house in it, the king has a prerogative which no other prince can boast of, viz., to claim the best part of it; for the first floor of every house in Madrid belongs to the king, till it be purchased of him by the owner. It is of note, also, for a famous bridge built over the Tagus by Philip II.; but the river in summer time is there so shallow that some could not forbear saying, his Catholic Majesty would be obliged to sell the bridge to buy water for the river."

The corps of engineers we have mentioned so frequently has put Madrid upon a different footing; but it has still gigantic tasks before it. Great credit is due to the commission who have so laboriously shown the increasing prosperity of their country. They exhibit ninety-nine drawings of bridges, 176 drawings of lighthouses, showing the whole system of lighting the coasts in possession of Spain; a collection of thirty-two drawings relating to the different ports, difficult lengths in the routes of railways, and canal works; six volumes of photographs, illustrating twenty lighthouses, thirty ancient bridges, thirty modern bridges, forty-six iron bridges, forty constructional works on lines of communication, and thirty aspects of the canal of Isabel II. Besides these, the engineering world is informed of a project for a port of refuge on the coasts of Asturias, in three volumes, and of another for a railway from Cadiz to Gibraltar, in five volumes.

THE PUBLIC WORKS OF THE FRENCH EMPIRE.

THE prediction of Louis XIV., or rather the authoritative announcement of that powerful monarch, when the long-coveted crown of Spain had at length encircled the brow of a cadet of the House of Bourbon, that the Pyrenees no longer existed, has not as yet been verified by the march of events. But that which Royal power and family compact have failed to effect has to some extent been accomplished by science. Physical lines of demarcation have lost half their importance, since they have ceased to retard the transmission of intelligence. At a period when the twelve-mile tunnel through the very bowels of the Alps is already pierced for more than half its distance, and when, notwithstanding, the impatient international traffic is demanding the service of the temporary mountain railway constructed by Mr. Fell, we are fast diminishing the importance of mountain frontiers as barriers to the circulation of travellers and tourists. The collapse of speculation has alone prevented the coming off of the interesting duel between the advocates of a ferry over, and those of a tunnel under, the English Channel, supposing the latter, indeed, to have at any time entertained the intention of seriously backing their own wild proposal. Not a year passes without affording fresh facilities for that mutual acquisition of knowledge as to the habits of the various citizens of Europe, which has made such steady progress since the days of Hogarth and of Gilray. And although, ever and anon, the appearance of the conventional Englishman on the boards of the Paris stage, where we have seen him represented in a short surtout coat furnished with a cape, top-boots, and straps! (an impossible combination which does the greatest credit to the genius of the green-room), or the issue of some literary display of the English as certainly they do not appear to their own eyes, bears testimony to the continued existence of the Channel dividing Dover from Calais, still the process of fraternisation is going on with unchecked rapidity.

While the facilities which steam-communication by sea and by land affords to the pursuit of business or of pleasure thus form a main characteristic of our times, we have perhaps hardly yet fully appreciated the important addition which is at the same time offered to the elements of national education. We do not here refer to education in the merely technical sense, to the newly-imported adaptations of the latest German grammatical confusion of either the Latin or the English tongue, or to the clear and systematic, if somewhat superficial, treatises which French ministers of education find time to publish for the benefit of the *Lycées* over which they successively preside.

We refer to that broader and more permanent form of social education which consists in studying those conditions of political and of physical life in which other countries differ from our own, and in deducing the lessons as to our own future which such studies are calculated to teach. At no period in the history of the world has social experiment been conducted on so gigantic a scale, and under such widely varying conditions as at present; so that at the very time when the barriers are being cast down, behind which each kingdom or republic has so long enjoyed a more or less isolated existence, and when the man who, like the great father of modern thought, seeks to study on the spot the institutions of other countries before writing on those proper to his own, can most freely gather the incidents on which to base his work, each variety of habit, and each contrariety of principle may be found undergoing a portentous and unexampled development. On one hand we see the flag of the purest absolutism nailed to the mast, and the principles of that authority which, rather less than three centuries ago, literally and positively condemned every man, woman, and child in the Netherlands to be burned, beheaded, or buried alive, as unhesitatingly asserted as by the edicts of the execrable Philip II. of Spain. On the other hand, we see the rule of the majority, pure and simple, carried to its most tyrannical extreme by the invention of the "caucus" and the "previous question," and we can watch the results of these two opposite systems in the weekly intelligence that reaches us from the shores of the Tiber and from the western coasts of the Atlantic.

The point to which, on the present occasion, we are most anxious to direct attention, is that of the opposite principles on which the public works of the British and of the French empires are at this moment conducted. And this we do not in the spirit of either self-gratulation or self-depreciation. It is not in order to say, "They manage these matters better in France," or, "Let all the world come and learn of us." It is rather in the pure spirit of inquiry. Something, nay, very much, may be due to the difference of national bent and genius; but the question whether it is better for the Government to charge itself with the conduct of the public works of a country, or whether it is better to leave these works to individual enterprise, is one which it is most important fully to elucidate.

The French Emperor has just decreed a large expenditure for the purpose of country roads, the planting of denuded mountains, and similar purposes; including, no doubt, protection against the destructive inundations which have been so much increased in frequency and in mischief by the reckless destruction of timber, and, at all events, the more important works of irrigation and of drainage. No one who knows France can doubt that the 32,400,000*l.* sterling which it is proposed to apply to these purposes during the next ten years will be, if well laid out, highly reproductive. The expenditure in question is to be divided between the State, the Departments, and the Communes, which are to be benefited not only by the works themselves, but by the encouragement that will be given to local industry in the course of their construction. The sum in itself seems large, but it must be remembered that it amounts to but little more than 700*l.* per week for each of the eighty-nine departments of France,—an expenditure that can hardly be considered, when regarded as thus divided, as in any way excessive, or likely unduly to affect the labour market. The only question as to which hesitation arises in our mode of viewing the case is as to the mode of thus developing the industrial wealth of the country. It is foreign to our habits, it is contrary to the principles of that school of politicians which among ourselves may almost alone be termed demi-scientific, and it is contrary to the experience which we have derived from such efforts of a like nature as we have ourselves made on such occasions as that of the Irish famine.

On the other hand, it cannot be contended that our own system has effected a very notable triumph. Thirty years is much in the life of an individual: it is comparatively little in that of a nation or of a system. It is now about a third of a century since a great impulse was given to our domestic enterprise by the successful establishment of steam locomotion between London and Birmingham. Since that time private enterprise has expended on our railways a sum equal to nearly three-quarters of the national debt. The public are, perhaps, only beginning practically to realise the ill-results of the enormous waste with which this expenditure has been conducted. It has not been the case that the tyranny of the trades' unions or the organization of the *phalanstère* has caused a wasteful remuneration of labour. As far as the actual labourers are concerned, it is probable that at no period of human history has so much hard, steady, persevering labour been called into continuous exercise as that which has executed our iron roads. With us the demoralization has been limited to the more educated classes. The "navvy," indeed, may have been too much accustomed to take out the balance of his fortnight's pay at the beer-house, or to indulge in two or three days' oblivion of a month's incessant toil by the too-ready aid of John Barleycorn. But whether he drank out or otherwise spent or saved his earnings, no one can deny that they were fairly won. High as the wages paid to a skilled earth-workman seemed when contrasted with those of an agricultural labourer, there is no doubt that they were not disproportioned to the duty performed. In almost all cases piecework prices gave the workman a higher remuneration than the ordinary day-work tarif. A certain consumption of oxygen was involved, a demand on thew and muscle that made necessary a more generous diet. So many millions of cubic yards could not be removed without a certain production or liberation of heat, even if the motive force had been other than human labour. As far as the actual operatives, the engineer and his staff of workmen, are concerned, we are convinced that our public works can vie with those of any nation or any time in real economy of construction. It is one thing to wheel a barrowful of earth up a plank, at an inclination of one in ten, and another to send the contents the same distance in a dozen baskets on the heads of so many women or girls, as is done in the south of France, or in Italy. Our own choice is in favour of our own method of work.

But when we learn the actual scene of the labours of the engineer, the aspect of affairs has entirely changed. In the present silence of Westminster Hall, and disconsolate aspect of Great George-street, it is difficult to realise the state of things in the good old times of post-chaises-and-four and of express trains hasting to depart. Landowners, counsel, witnesses—what a ravenous host fixed on our railway capital when in its nascent state, that condition in which, as chemists tell us, disturbing action is most powerful. Chief culprit, no doubt, was the legislature, but the legislature itself is only to some extent an embodiment and intensification of the public. Profligate expenditure on properly designed works, or rather in obtaining the necessary authorisation for such works, more profligate expenditure on works which never should have been authorised, have been steadily encouraged, or stolidly winked at, for more than a quarter of a century, by the public opinion so much glorified among us.

The result, long bitterly experienced by the unfortunate shareholders, is now becoming more palpable to the public. A great voice of grumbling is everywhere heard. Here the fares are raised; there the trains are taken off; in a third instance a distance may be certainly accomplished by railway in but little longer time than it could be performed in on foot; in a fourth case, any exact calculation of time is out of the question. The old features of the coaching competition of former days are quietly reappearing, to the grief of this more locomotive

age. Companies which, fighting one another to the last gasp, have striven by every possible blandishment to attract one another's customers, have at last, in the very agony of impecuniosity, come to an agrement which, if made in time, would have saved a third of their outlay, and enabled them to serve at the same time the shareholders and the public. For these two interests, however it may be sought to divide them, are essentially one. If the public encourage waste, the public will have eventually to bear the loss of that waste. A constituency that has disbursed from five to six hundred millions sterling forms indeed no inconsiderable portion of the public; but we are speaking of the customers of our great carriers alone. If a company be encouraged or permitted to expend fifteen millions where ten millions should have sufficed, the travelling public will certainly have, in one shape or another, in increased prices or in decreased efficiency of service, sooner or later to pay forfeit for that wasted five millions; and this is precisely the stage in railway experience at which we are now arriving.

We cannot, therefore, admit that the political economists of our day, the gentlemen who endeavour to make half science do the duty of whole science, and to decide the course of social action by an appeal to some of its lowest principles, have much cause to congratulate themselves, or to look for the gratitude of the public, on the reflection that they have had altogether their own way with our public works. Still less can we admit that they are entitled to deliver an *ex cathedrâ* judgment as to the wisdom of the present effort of the French Government to provide for the communications of the rural districts. We are not advocating the French system. We are not expressing an opinion as to its merits or demerits. We have seen France adorning herself with noble cities; we can hardly recognise, in the Paris, the Lyons, the Marseilles of the empire, the strongholds of the revolutionists of even so late a date as the year 1830. But we feel that these palatial buildings may have been erected at too great a cost. We know that the system adopted has incurred a great and a certain risk. We are seeking, therefore, not to enounce opinions, but to collect facts. We are desirous to store up and to systematise the experience which fifteen years of the Imperial policy with respect to the relations between labour and the state has allowed our brilliant neighbours to accumulate. We know, or we are likely to know, the worst as well as the best of the results of our own system. We have, perhaps, seen the best of those of the opposite plan. It may be that we have yet to wait to see the reverse of the medal, the shades as well as the lights of the picture. At all events, in our own enforced idleness we cannot do better than to study carefully the different cases of this great problem, and compare the results of labour directed by the State with those of labour directed by private enterprise. It is not out of the usual course of events to suppose that some *via media* may be arrived at, that some leading principles may be detected. That private enterpise, if directed by the exclusively selfish principles, let us say the intelligently selfish principles, which are so loudly advocated among ourselves, may produce results unfavourable to the best interests of the community, we have palpable and painful proof. That State interference with labour may for a time give prosperity to the operative at the more or less compulsory cost of the trading and rent-owning classes of society, we think France is a witness. Whether or no collapse will follow, and whether the results of such collapse, if it occur, may be more or less disastrous to the entire community than the degree of inefficiency and waste that has hitherto been inseparable from our own system, it is for the future to show. In each case the decision has, to a certain extent, been in the hands of the Government. Legislative sanction is as necessary for the construction of an English as of a French railway. If we think that the prefects and ministers of the empire have interfered too much with the right of private enterprise, if we prefer the distinction which our own civic authorities attain in the way of banqueting—and of any other means of distinction, if such they have—to the ædileship of the prefect of the Seine, at all events, we cannot point to the imperial sanction of such a scheme as the London, Chatham, and Dover Railway, or to a conglomeration of ill-adjusted lines like those which circumvallate London Bridge. Our first step is to ascertain the actual facts; our second—and that is as yet a long way off—is to proceed to apply our knowledge in the best and most practical way. The idea that the Englishman has nothing to learn from the foreigners is becoming decidedly out of date. How much evil we owe to its long, though generally tacit, influence, it would be hard to say.

THE BRITISH ASSOCIATION FOR SCIENCE IN DUNDEE.

In our last notice of the meeting at Dundee, we intimated the intention of referring to papers that were read. But selection from the number is difficult. In every one of the Sections, not excluding Section D ("Biology"), subjects were treated of immediately pertinent to the field of practical architecture; and it is simply astonishing that the profession continues to be so little represented in the Association. There were several engineers in Dundee; but excepting the representative of this journal, and Mr. Mylne and Mr. Fergusson, we know not who there were to testify by their presence that true architecture requires to take cognizance of the progression in science, just as much as of results of archæologic exploration. If architecture is to be living and progressive,—art in fact, and not in name merely,—it must be comprehensive also of all the science that relates to building. Real art in architecture is all but impossible without knowledge of the properties of materials, and of the laws of vision; successful planning of numerous kinds of buildings requires the study of branches of "Economic Science;" and the history itself, of art, and the analysis of styles, is but inadequately studied unless with reference to "Ethnology" and the characteristics of races and peoples. Consequently we need offer to our readers no explanation for taking them out of the field of "Mechanical Science" (Section G), and for noting down some of the subjects of papers, in other Sections, which we are unable to report at length.

Let us refer to the Report of the Lunar Committee in the Section (A) of "Mathematical and Physical Science," for the sake of reporting the observation of Sir Wm. Thomson, the president of the Section, on the increasing importance of this subject to the science of geology. He said "the Huttonians would be forced before long to take the subject of lunar volcanoes into account," and that "a great revolution in geological speculation must soon take place."

In the same Section Mr. J. Clerk Maxwell read a paper on a "Real Image Stereoscope, with Illustrations of Solid Geometry." In ordinary stereoscopes the observer places his two eyes opposite two lenses, and sees the *virtual* images of two pictures apparently at the same place. In the real image stereoscope, the observer stands about 2 ft. from the instrument, and looks at a frame containing a single large lens. He then sees, just in front of the lens, a real and inverted image of each of the two pictures, the union of which forms the appearance of a solid figure in the air between himself and the apparatus. A number of figures of mathematical surfaces as defined by their lines of curvature have been engraved, and some of these will be published in the *Quarterly Journal of Mathematics*. Subsequently, a paper on "A New Fact in Binocular Vision" was read by Mr. A. Claudet. Mr. Balfour Stewart read a paper "On the Behaviour of the Aneroid Barometer at different Pressures." It consisted chiefly of an inquiry as to the extent to which an aneroid might be taken as a reliable instrument when exposed to considerable changes of pressure such as occurred in mountain ascents.

In Section B, Chemical Science, the president, Professor Thos. Anderson, referred to the present insufficiency of the atomic theory, at least in the form in which Dalton left it, to explain the facts accumulated in the last twenty or thirty years; which, besides other results, had given the paramount importance formerly ascribed to oxygen, rather to carbon as an element. On the same day, a paper on the Decay of Stone, was read.

Professor Wanklyn read a paper on "The Existence of Putrescible Matter in River and Lake Waters," in which he detailed several analyses which he had made in seeking to detect the presence of organic matter in London water.

Mr. Dugald Campbell then read a note on "Messrs. Wanklyn, Chapman, & Smith's Method of Determining Nitrogenous Organic Matters in Water," which was replied to by Professor Wanklyn, and caused a good deal of discussion in which Dr. Angus Smith took a prominent part.

A description of a new anemometer for measuring the speed of air in flues, was read by Mr. A. E. Fletcher, Government Inspector of Alkali Works for the Western District. The instrument makes use of ether, but dispenses with the introduction of any delicate contrivance into the vitiated air; and the construction of the apparatus is based on the fact that a current of air passing across the open end of a straight tube, causes a partial vacuum in it. An application of this principle is seen in a small toy in common use. The anemometer is described in the "Third Report of the Inspector of Alkali Works, 1866," which may, no doubt, be procured from the Queen's printers. With this description is a table to show the speed of currents of air as indicated by the apparatus. The instrument is so sensitive, that on a windy day the effect of each successive gust is observable as variations are caused in the draught of the chimney. By a modification, the apparatus may be used as a wind gauge. Testimony was given, in the Section, to the efficiency of the contrivance.

Mr. Fletcher then showed a "self-registering perpetual aspirator." A small fan placed in an opening in the side of a chimney communicates with a bellows which drives air from the flue through testing bottles, and thus the amount of acid passing through the flue is indicated.

Mr. G. Ansell gave an explanation of "an apparatus for indicating the pressure and amount of fire-damp in mines." The idea embodied in the machine was founded on the law of diffusion announced by Graham, that gases diffuse in the inverse proportion to the square root of their densities, or, more popularly, that light gases diffuse more rapidly than heavy ones. Mr. Ansell here showed by experiment that, when a tube closed at one end by plaster of Paris, is filled with common coal gas, the lighter part of the compound is rapidly diffused through the plaster, as is at once seen by the yellow flame and slight explosion which ensue on bringing a lighted match close to the closed end. Hence, Mr. Ansell said, his proposition. In a pit the case is the reverse of that of the tube. There the gas is ready to escape into the galleries, and the apparatus must, therefore, be modified to suit the varying circumstances. The essential parts of the apparatus may be described as consisting of an alarm-bell and a telegraph-needle,—the former being rung and the latter deflected by an electric current, which is set in motion by the action of the dangerous gas. The means by which this is effected consist of an iron cup, on which is fixed a disc of white Sicilian marble, standing on a U-tube, which contains a quantity of mercury. The marble here represents the plaster which closed the end of the tube in the first experiment, and through it the dangerous gas is diffused. As it does so the mercury is pressed up into the other extremity of the tube, completes the previously broken circuit, and an alarm is given by the ringing of the bell and the deflection of the needle. When the apparatus is intended to indicate a sudden eruption of gas, marble ¾ in. thick should be used. When there is a slow accumulation of gas, rising to 10 per cent. (10½ being the most explosive), the apparatus detects it, and points out the danger. Again, when it is wished to give warning to a man who had left the pit that gas had accumulated in his absence, marble ½ in. thick is used, and the danger is indicated as before. Mr. Ansell stated that he had used the instrument in the Monkland pits at Airdrie, where it had been also used independently by Mr. Mowie. It had been fitted up in the upper part of a gallery where Mr. Ansell and Mr. Mowie were unable to detect any gas. The instrument gave the alarm, and Mr. Ansell remarked that in this case it must be incorrect; but on elevating a light into the upper current, an explosion followed, showing that gas had indeed been there. Mr. Ansell went on to say that when gas was known to be present, it was of great importance to learn whether the per centage is increasing or diminishing. This he has accomplished by means of a modification of the Aneroid barometer. Mr. Ansell thought that he would be able to improve his apparatus by substituting such a corrugated metallic chamber as that in the Aneroid for the column of mercury which was used to make connexion between the poles of the battery.

Professor Anderson believed that this was the first attempt to apply the law of diffusion to

practical purposes, and it was certainly of the highest importance.

Mr. Bell, Newcastle, feared that the very nature of the work of a colliery, which would necessitate the perpetual movement of the apparatus, might impede its use by the workmen; but thought that, in the hands of the coal-viewers, it might be turned to good account, as the accidents most feared by coal-owners were those in which the atmosphere of a whole gallery, or a portion of one, is polluted. This apparatus might be applied to prevent such wholesale catastrophes.

Mr. Ansell mentioned that Mr. Mowie had suggested that the whole apparatus should be enclosed. When this was done the workmen had in no way misused it.

Mr. J. Lowthian Bell read a paper on "The Present State of the Manufacture of Iron in Britain, and its Position, as compared with that of some other Countries." The paper was suggested by the opportunity afforded in the Paris Exposition of comparing the position held by English and foreign manufacturers. Mr. Bell wished, by a comparison of foreign and British iron-masters and their mechanical progress, to discover whether the opinion that our country was advancing less rapidly than some Continental nations, was well founded. He regretted that some of the English specimens showed great slovenliness of workmanship; but, notwithstanding this, and the very fine specimens exhibited by foreigners, after careful investigation, in which he had received all possible assistance, he would maintain that British industry and enterprise had not fallen behind those of the Continent. Mr. Bell referred to the past history of the art as showing which nation had contributed most to its present advanced state. Beginning with the introduction of mineral fuel by Dudley, he spoke of Cort's rolling-mill, and Nilson's application of heated air, to aid in reducing ore, as being really revolutions in the manufacture of iron. He further noticed the improvement of furnaces introduced by the Durham and Yorkshire iron masters, which at once raised the temperature and effected a saving in fuel; the introduction of the steam-hammer for the manufacture of armour-plates; and the discovery by Sanderson that rolled plates would be more suitable. Such were the contributions of this country, which other nations had turned to account as occasion offered. The chief difference between this and other nations consisted in the fuel. Foreign coal, not being so pure as our own, gave rise to various improvements in its cleansing, and in the production of coke. Similarly in France they turned to account the excessive wasted heat, and also the combustion of the gases which burn at the top of the furnace; but our own ironmasters were not less ready to adopt these improvements when the price of coal made it profitable for them to purify it, improve the coke, and turn the gases and wasted heat to account. As to steel, Bessemer's improvements were so great as to eclipse all others. Mr. Bell remarked that his personal acquaintance with the manufacture of iron at home and abroad for many years led him to suppose that there had been no change in the relative position of our own and other nations. The present state of trade had led many to suppose that more rapid mechanical progress was being made abroad than in our own country, but this, he was persuaded, was a mistaken conclusion. In this country the royalties to be paid in connexion with mines were excessive as compared with those of the Continent, but this was counterbalanced by the expense to which foreigners were put in procuring fuel. Nor was it true that foreign workmen were better educated than those of Britain: neither can be looked on as superior, scientifically, to the other. Again, in Britain there was greater facility for reaching a seaport, owing to our insular position; but the easier charge for royalty and the lower railway charges compensated for this. This did not, however, account for the disappearance of much of the trade, which was wholly due to the cheaper rate at which labour is obtained abroad. He concluded by showing that on an examination of the economic position of the workmen they stood on almost perfect equality as to the cost of the necessaries of life.

Professors Anderson, Williamson, and Odling spoke very highly of Mr. Bell's paper.

In the Geological Section (C) the most interesting part of the proceedings was the address of the president of the Section, Mr. Archibald Geikie, especially if viewed in connexion with his lecture, mentioned in a former notice. The present state of knowledge of the geology of Scotland was clearly set forth; whilst it was allowed to be seen how much is yet undetermined as to the relative importance of time, and erosion by water, and of sudden upheavals as by volcanic action. In this Section, Mr. J. Wyatt read a lengthy paper on "The Gradual Alteration of the Coast Line in Norfolk." It described the result of observation on the changing coast line; and as others had for years past called attention to the waste and erosion by the sea constantly in progress, the author showed that the geological changes in this part of the island were not all to the loss of the nation. On the contrary, he proved that in West Norfolk there was a continual addition to the area. A secondary object of the paper was to enforce the necessity of accurate records of the changes of coast lines, and the author suggested that this should not be left to individual observation, but should be undertaken by a responsible department of the Government, who should combine the two systems adopted by the Ordnance and Admiralty surveyors, and so secure by periodical surveys accurate maps of the changing line of the coasts, the fluctuation of the levels of the sea bottoms, and the nature of the deposits within a given distance of the shore. In the same Section, a paper "On the Preseberg Iron Mines in Sweden," was read by Dr. Clement Le Neve Foster.

The Biological Section (D), presided over by Professor Sharpey, was divided into two departments, viz., "Zoology and Botany," and "Anatomy and Physiology." In the first of these a paper bearing upon a subject of considerable interest to readers of the *Builder* was read by Mr. A. Murray, entitled, "The Future Administration of the Natural History Collections of the British Museum." It was a merciless, but apparently needed, exposure of the system of formation of the collections, that has prevailed. This was followed by a paper by Dr. Lauder Lindsay, entitled, "Is Lichen-growth any Criterion of the Age of Pre-historic Structures?" In the other department a paper was read by Dr. Davy, "On the Influence of Air on Vital Action, as tested by the Air-pump." The author described experiments which showed how much longer some animals are capable of resisting privation of air than others. In one instance an egg, an inchoate animal so to speak, was hatched, producing a healthy chicken, after having been acted upon by an air-pump twenty-six days; a young bird expiring in about half a minute, a fish—the minnow—in about half an hour, the frog and toad in about the same time, the earthworm in about an hour and a half; insects, such as the bug, dragonfly, and butterfly, after apparent death for more than an hour, recovering on exposure to the air, and that repeatedly. By other experiments on birds by means of submersion in water, he showed that different species vary greatly in ability to bear exclusion of air: thus while all the snake-birds of which he had made trial expired under water in a minute or less, the buzzard lived about twenty minutes and a half, the common fowl about four minutes and a half, the goose and duck about ten minutes. Reasoning on the results, he infers that each individual animal has something peculiar in its organisation determining its peculiarities of function or action, peculiarities more readily described than accounted for. He holds the subject to be in a great measure mysterious, nor is he sanguine, referring to the new and ingenious views on the genesis of species, that they will tend, except partially, to enlighten the subject, considering that life itself is a mystery, and the origination of life, as regards Natural Science, an unsolved problem.

DISCOVERY IN SHEFFIELD PARISH CHURCH.—In erecting a new clock, it has been necessary to cut a circular hole in the north side of the tower, for the reception of one of the dials. In doing this a stone was found embedded in the rubble filling of the wall, measuring 11 in. by about 12 in., and about 9 in. deep. The face of this stone was carved with a simple variety of the indented chevron moulding, and had evidently formed a portion of an arch in the Norman church. Judging from analogous cases, this stone, it is thought, had probably been fixed in the chancel-arch, its size indicating that the span of the arch would be 16½ ft. The pattern upon the stone fixes the date of the church as in the twelfth century, thus agreeing with the opinion of Hunter.

ARCHITECTURAL DOINGS IN GERMANY.

Prussia.—In Berlin, the rebuilding of the cathedral, or "dom," has for some time been determined upon, and the first active step in this direction was a public competition by Prussian architects. The conditions these gentlemen had to bear in mind were manifold and difficult, particularly as the preservation of several existing parts was insisted on. Thus the "campo santo," on the north, which will ultimately be decorated with frescoes by Cornelius, was to be retained; the foundations towards the east, abutting on the Spree, were again to be made use of; the Royal Dispensary, on the south, was not to be interfered with; and whilst certain liberty was given as to the western extension, still the new building was not to exclude a view of the museum from a certain porch in the Palace. Whether these conditions crippled the competing architects too much, or whether the designs submitted were all open to serious objections, we know not, but certain it is that no better design was obtained than one prepared some years ago by the late Professor Stüler, and accordingly his plans are to be carried out. The cathedral, which will be of classic style (Corinthian), will have a length of 230 ft. by a height of 140 ft. to the ridge. A dome 190 ft. high will rise above this, carrying a tower, which, including the cross at top, will be 70 ft. high, giving a total of 400 ft. The cost is not to exceed 3,000,000 thalers, or about 450,000*l.*——The new Hôtel de Ville, of which we have a model in the Paris Exhibition this year, is now rapidly advancing towards completion. The style is essentially German Gothic; but the dark brick is effective, and the internal arrangement very complete. The great central tower is unique in its upper treatment, being crowned with a steeply sloping roof, flattened at the apex, and forming an octagonal plateau. From the corners of this plateau rise eight strongly curved ribs, terminating in a flag-post, and within this sort of open crown will be hung the clock-bells. We doubt the wisdom of an arrangement whereby the bells will hang utterly unprotected against the inclemency of the weather.——Count Blücher is about to erect a mansion of great size and cost on the "Pariser Platz." Mr. Richter is the architect. ——The late political changes in Germany have necessarily had their influence upon this city, which is in reality, though scarcely as yet in name, the capital of Germany. One of the first necessities was the extension of the War Office, and the erection of a new wing on the park side of the present building has been decreed.—— Baurath Herrmann (his full title is "Baurath and Oberbauinspector,"—the latter rather a mouthful) has received the order to visit London and Paris, in order to study the Parliament-houses of both capitals; this, too, is a sign of the political times, as also the fact that the subject competed for at the Academy of Arts this year was "A Design for a House of Parliament for the North German Reichstag." Mr. K. H. Schäffer, architect, of Brandenburg, was the successful candidate.——Some sixty students, who were accompanied by two professors, have just returned to the Academy of Architecture, after their annual sketching tour. They extended their trip as far as Kiel and Hamburg, where they were received with great attention. Among other civilities afforded them, the Hamburg American Steamboat Company gave them a trip down the Elbe, on board the *Germania*. We know from personal experience the value of these annual sketching tours under the guidance of the masters attached to the German "Academies," and recollect meeting a bevy at Nuremberg. Scattered throughout the town, in the churches, on the Schloss, we found them, sitting alone, or by twos, on their camp stools, sketching, and often colouring in too. The masters would go the round, now stopping to correct a perspective sketch, now pointing to peculiar features, perhaps comparing them with others elsewhere; or they would fix a date, or help to take a measurement. The evenings are passed sociably, the professors mostly joining the students, and losing no prestige by so doing. ——A year or so ago Frankfort would have had a paragraph to itself: now it must need stake its place here, as elsewhere, under Prussia. We noticed briefly recently that a committee had been formed for the rebuilding of the cathedral. On the evening of the 26th ult., a well-attended meeting was held in the *salle-à-manger* of the Hôtel du Nord, those present being mostly members of the Archæological Society and the

Artists' Club of Frankfort. There was but one opinion as to the desirability of reconstructing the dom as soon as possible, but the next two proposals were the subject of warm discussion. The first proposal was that the tower should be restored to its precise form before the fire, but this was met by a counter-proposal that a spire should take the place of the former cupola, which, it was contended, was not in keeping with the character of the tower itself, and should therefore not be replaced. The other proposal was one of ways and means. Some argued that all Germany should be appealed to for funds, inasmuch as the Dom was a national monument, intimately associated with the history of the nation for a thousand years. Others held that the Frankforters had ever helped themselves, and would do so now. The result of the meeting was the appointment of a committee, consisting of the leading members of both societies, for the purpose of considering both questions and reporting thereon. In the meantime we hear of subscriptions coming in from all sides. The King of Prussia has ordered 30,000 dollars (4,500*l.*) to be paid *annually* to the fund, and the young King of Bavaria, who promises to be as great an art-lover as his grandfather, "old Ludwig," has contributed a donation of 5,000*l.*

Austria.—In Vienna there is comparatively but little doing, owing probably to the slow recovery of the nation from the effects of the late war. The principal object of any interest and size is the new "Conservatorium," which is being erected under the auspices of the Association of the "Friends of Music." The building, which is Renaissance in style, is estimated to cost upwards of 50,000*l.*, and is being executed from the designs of Mr. Theophil Hansen, to whom the first place was accorded in the late public competition for this object. The Emperor, who takes a great interest in the matter, has presented the Society with the site, free of all expense, for ever, and has, moreover, granted them the very questionable proceeds of two "State lotteries." The Votive Church, for some years in course of construction, has come to a standstill for want of funds, but an effort recently made to meet the remaining expenses has been so far successful that the works are again to be continued. The church, however, will hardly be completed for the next five years, and even then much of the stone carving will necessarily remain in block.

VENTILATION IN AMERICA.

WE have received from Mr. L. W. Leeds, of Philadelphia, a pamphlet on Ventilation, being the substance of a course of lectures delivered by him in the Franklin Institute, together with various diagrams and lithographs.* It appears that Mr. Leeds was employed during the late war by the Quartermaster-General and Surgeon-General in directing the introduction of improvements in ventilation in all the Government hospitals, and in making and collecting plans of the buildings under Government control, and is now consulting engineer of ventilation and heating for the Treasury Department, giving him charge of the heating and ventilation of the Treasury buildings, all the custom-houses, marine hospitals, most of the post-offices, and United States court-rooms, these buildings being all under the care of that department.

The following communication accompanied the pamphlet:—

"Although a stranger to you, I feel like addressing an old acquaintance, made so by the constant perusal for many years past of your very valuable paper.

I believe to-day, and have thought for years past, that the *Builder* exerted the greatest influence for the spread of correct and valuable information in sanitary science of any publication now extant, not only in the place of its publication, but in this country as well.

Your frequent articles on Ventilation, and your very urgent appeals for fresh air, greatly interest me. It is with much pleasure, therefore, that I forward you copies of some lectures delivered last winter before the Franklin Institute of this city upon that subject, and which have just been published in the *Journal* of that Institute. No greater satisfaction could be afforded me than the approval by the *Builder* of the views expressed in those lectures.

You will see that I lay much stress on the necessity for *an* opening for the exit for the used air on a level with or below the floor, especially for winter. Although it is but a small portion of the year that dependence should be placed mainly on floor exits for the foul air, yet, as that small portion of the time is just when artificial ventilation is most relied upon, and that there is no disadvantage in leaving them open at all other times, I think this provision for floor ventilation thus becomes one of the most important considerations in *artificial* ventilation.

It has been my endeavour to illustrate clearly, in a simple way, when floor ventilation was necessary, and when ceiling ventilation was best. I have been a strenuous advocate for the necessity for floor ventilation for fifteen years; but, being opposed by all physicians and eminent writers on the subject, I could make but little impression. But within a year or two, a very great change has taken place in this country on this subject. It is now admitted by all thoughtful and intelligent writers upon the subject to be of great practical importance.

The adoption of this principle by the Government during our late war was of great advantage in this respect.

I should infer, from the tenor of frequent communications published in the *Builder*, that you Englishmen have not considered in all its bearings the effect of dispensing with that great charm of an English *home*, "the fireside." I know the open fire has its great inconveniences, and is entirely inadmissible in many buildings, but I think you have scarcely comprehended the value of an open *fireplace* alone, even without the fire, for winter ventilation. I think, therefore, the remarks in the lecture upon that subject will apply to you as well as to the Philadelphians.

It seems to me best not to encourage the thoughtless or casual observer to believe that any good ventilating arrangement can ever be made to work automatically. Automatic feeding machines or drinking apparatus, or automatic dressing machines, I think would be more likely to work successfully than any automatic ventilating machine—that would supply us at all times and in all places with air of just the right temperature and just the right quantity to meet all the various changes in the external atmosphere and the constantly varying condition of our physical system. I think we must depend *only* on the proper education, and on the intelligent, thoughtful care of every one to know and see that he is careful to breath nothing but pure air all the time."

The lectures are a vigorous protest against the want of provision for the supply of fresh air everywhere apparent; and numerous simple experiments are made to show the immense importance of fresh air, and the evils that result from want of it. Their circulation cannot fail to effect much good. Mr. Leeds is quite right in urging the value of the open fireplace. In many cases floor ventilation, we agree with him, is important; but this must by no means be taken to mean that exits for foul air in the upper part of apartments are not absolutely required.

Opinions in these matters, supported equally by large experience, strangely differ. Thus, Dr. Templeton, in the very interesting communication printed in our last number, though he points to the occurrence under certain circumstances of a stratum of foul air next the floor, provides in the system he has carried into practice, for outlets and inlets only at the top:* the friction of the current on the volume of air in the room soon sets the mass in gentle motion, revolving on a horizontal axis, and sweeps out, so to speak, a portion of the impure air previously in the room. In a letter further explaining his views, Dr. Templeton writes,—

"I can best explain the principle thus: suppose a circular pond in a meadow with a stream running tangentially across one point of the circumference and freely communicating with it; the friction of the fluid will very soon excite in it a revolving motion round its centre, acquire to it a portion of fresh fluid from the stream, and detach from it a part of that which has already circulated; the activity of the change depending on the size and velocity of the stream. My stream is fresh air, and the pond the room to be ventilated. It will be seen at a glance how important it is that the stream's course should be as direct as possible. My experiments confirm this."

The papers sent by Mr. Leeds include illustrations of a stove made by his direction for the American Western Hospitals where they burn bituminous coal. Many hundreds were made, and they proved, he says, very satisfactory. This stove includes a water-boiler on the top of it round the smoke pipe, perforated at the sides, under the cover, for the escape of moisture. The lower part is cased, and fresh air is brought from outside into the chamber thus formed and passes into the room warmed. The objection that occurs to us, without further explanation, is the contact with highly heated metal of the air brought in to supply the apartment. The same objection seems to apply to the arrangement for temporary hospitals illustrated.

We sincerely hope that America will listen to the arguments and statements of Mr. Leeds as to the vital importance of fresh air.

INDUSTRIAL EDUCATION.

WHILE various continental nations are going ahead in manufacturing skill, we seem to be standing still, and to stand still in such a position is to retrograde, all the more especially while other nations are surpassing us. We are glad to observe that a consciousness of our position in this respect is awakening manufacturers themselves to the necessity for being up and astir in the industrial race. Messrs. G. H. Nussey & A. Nussey, of Leeds, manufacturers, have issued a pamphlet, "A Technical Institution for Leeds and District," in which they take an enlightened view of our shortcomings and of what we require to enable us to hold our own in the markets of the manufacturing world. The late wool sales, they state, show effectually the progress of the foreign woollen manufacturers, half the wool having been bought by them for their own consumption, although fifteen years ago foreign buyers were rare. The woollen manufacture is what the authors of this pamphlet are more especially interested in; but the question is one which applies to all our manufactures. Messrs. Nussey suggest that a school of weaving and designing should be established at once in Leeds, and the present local school of art improved. They propose:—

"A building to be erected, with every convenience for lecture-rooms and workshops, suitable for the various trades taught. The building to be as handsome as possible, compatible with economy—the taste of the inhabitants of a town being much improved by being surrounded with beautiful objects. An efficient staff of professors to be attached. The professors to give free lectures twice a day (say morning and evening) in order that all classes may enjoy the advantages of the institution. Pupils to be taken either as in or out-door pupils; the terms to be as low as possible, only high enough to make that department pay for itself. Comfortable quarters for the boys to be considered as a most important part of the arrangement of the building."

They state that "in our standard textile manufactures, cotton, woollen, worsted, silk, hosiery, and articles of common use, we are almost nowhere," and that it is "in these trades we find the greatest want of technical education." The inventive genius of foreign designers has much to do with the superiority of foreign goods, as in those of silk especially. The Lyons designers, for example, are all educated at the School of Fine Arts and Manufactures, where they are taught to weave, as well as to design and paint flowers, &c. Even the partners in a firm, or one of them at least, must have had artistic education. In short, the sound system of technical and scientific education for workpeople and employers that has been established by foreign Governments, and the great attention that has been paid to the scientific improvements relating to various manufactures, are the chief cause of the advance of manufacturing industry abroad.

The Nottingham manufacturers are astir on the subject. At a special meeting lately of the local Chamber of Commerce, the following motion to the Associated Chambers of Commerce was unanimously resolved upon:—

"That the importance of more extended education in relation to the various arts and manufactures of this country is recognised by us, and it is recommended that an inquiry should be made at the instance of the Government as to the state of education abroad as it affects the industries of various nations, and that a committee be appointed by the associated Chambers to counsel and assist the Government and the Chambers of Commerce in the promotion of industrial education."

The chairman said, that since this motion was drawn up he had ascertained that the Government had made some appointment for the purpose of making inquiries into industrial education abroad. The other day Mr. B. Samuelson, M.P., called upon him and informed him that he was commissioned by the Government to pursue this course of inquiry. He (the chairman) suggested that some gentleman should be associated with him in the important work, and, having communicated with the Government on the subject, they had appointed Pro-

* "Lectures on Ventilation." By Lewis W. Leeds. Philadelphia, U.S.: Lippincott & Co.

* See p. 676, *ante*.

fessor Leone Levi to assist him. It was high time that the subject was properly taken up, as there could be no doubt that foreign countries were beating us in our manufactures. The reason, as he went on to show, was entirely owing to our present system of education, and he was quite sure that until that system was improved no alteration could take place.

At a meeting of the central council of the Yorkshire Union of Mechanics' Institutions, also under the presidency of Mr. E. Baines, M.P., it has been resolved to institute an inquiry into the present means for the promotion of scientific and art education in Yorkshire, and to ascertain the opinion of the principal manufacturers and others as to what measures are required to increase and extend the means for the technical instruction of the managers and foremen of manufacturing establishments, as well as the more rudimentary scientific education of artisans. In the instructions given by the president to Mr. Henry H. Sales, who is charged with the inquiry, are the following directions:—

"You will inquire chiefly into the instruction given in the classes of the several institutions under these heads. 1. The art of design, and especially mechanical drawing. 2. Mathematics, especially applied to mechanical art. 3. The principles of mechanics. 4. Chemistry, especially applied to dyeing. You will learn distinctly whether the gentlemen whom you consult are of opinion that Mechanics' Institutions are calculated, if properly used, to effect the object in view, or whether it is essential to have some institutions of a higher class, exclusively designed for scientific and art education, and supported partly (and to what extent) by the public funds. You must also endeavour to judge how far our artizans would avail themselves of the opportunities for technical education, if offered, and whether, if evening classes be insufficient, we must look to the means of supporting students during their period of study."

In connexion with this subject we may here remark that a project for transforming the machine gallery at the Paris Exhibition into a gigantic international workshop is said to be just now before the Emperor. In estimating the whole of the steam engines employed at 2,000 horse-power, 4,000,000 francs yearly, it is estimated, might be realised by the rent, and a population of workmen now scattered might be fixed on the banks of the Seine. "It would be," says the Engineer Brissac in conclusion, "a cyclopean school without rival in the world, which would render to Paris, to France, and to industry, the greatest service."

Technical education in Austria is now being attended to with increasing interest. The Imperial Royal Polytechnic Institution at Vienna, established in 1816, for the object of promoting instruction in the practical sciences, at first formed a kind of preparatory school for artisans, but it has since been gradually extended and improved into what may be termed a scientific university; and since October, 1865, by imperial decree it has been created a "Hochschule," power being given to it to grant diplomas, and the entire course of education being made strictly compulsory, whilst a higher scale of knowledge is demanded from students applying for admission. Most of the students enter at about eighteen or nineteen years of age, having generally previously passed through an education of six annual courses in the Realschulen (Government schools, where solely technical subjects, entirely excluding the ancient languages, are taught), preceded by four annual courses in the Hauptschulen (preparatory Government schools for children).

THE ANCIENT BRITISH REMAINS IN YORKSHIRE AND DERBYSHIRE.

THE lateness of the harvest has prevented the resumption of the scientific examination of the Yorkshire tumuli until now. A tumulus examined near Weaverthorpe has given up relics almost if not quite unique. In excavating, quantities of red deer and other animal bones, all split longitudinally, for the marrow, were found. In the centre, in a circular grave of 10 ft. diameter, and nearly 6 ft. deep into the solid chalk, reminding us of the so-called chalk-pits elsewhere found and not yet clearly accounted for, was the skeleton of a Briton,—a warrior laid with his weapons beside him. The body was on the left side, with the head towards the north-east, and in a contracted position as usual. The right hand of the skeleton grasped a fine bronze dagger of the round ended (and early) type. The ovate-oblong blade was delicately thin, and the broad end had the three rivets (bronze) which fasten it to the handle, the mark of which still remained. A flint knife lay upon the dagger, and below it was a double-pointed awl or bodkin, of bronze,—a curious and novel implement. Over the breast were five very large jet buttons, and one of clay; and at the back of the skeleton, in the position it must have held when slung over the shoulder during life, was the fine bronze battle-axe (a model of the old stone axe) having the mark, on the patina, of the wooden handle. Only one tumulus of similar interest to this has been found: that is recorded in Bateman's "Ten Years' Diggings." The inquiries will extend over many months.

An interesting discovery of Celtic funeral urns has been made in the railway cutting near the picturesque hamlet of King's Newton, Derbyshire, in a situation not hitherto suspected as being likely to afford matter for archæological investigation. The height of the situation, the absence of any covering upon the urns save earth, and the paucity of other relics such as flints or bronze, prove that one of the early tribes had formed here a regular burial-place for the ashes of their dead. Cremation had been practised elsewhere, and the urns then brought to the grave-hill from the distant place where the funeral pyre had been erected. Small vases containing the ashes of infants were found; but in no case did the layer urns contain the smaller vessel called by antiquaries the "incense cup," or any bones except those of human beings. The ornamentation exhibits evidences of considerable taste and ingenuity, one fragment presenting the unusual feature of a double ring of crosses carefully impressed by means of a stamp.

IMPERIAL SCHOOL OF FINE ARTS, PARIS.

THIS year the subject for the grand prize in architecture was "Un Palais de l'Exposition des Beaux Arts."

The 1st prize was awarded to M. Henri Jean Emile Benard (*élève de* Paccard).

The 2nd prize to M. Pierre Henri Maneux (*élève de* Guenepin).

Both designs were excellently drawn, and would form a very interesting feature in our architectural exhibition, if their authors could be prevailed upon to send them.

ECONOMIC AND REFORMATORY LABOUR IN PRISONS.

THIS is a subject we have occasionally urged in the *Builder*, and we do not see why prisoners should not be set to useful and remunerative employment, not only for behoof of the public, but for their own behoof. It is odd that while such a system has been found practicable in other countries it should usually fail to be so in England. The Howard Association, of which Lord Brougham, Sir John Bowring, and other well-known men are patrons, have issued a circular on this subject, in which they say:—"English prisons are, in too many instances, merely places of temporary detention, and of very inefficient deterrence, inasmuch as many prisoners are re-committed thirty, forty, fifty, or even more times; and their condition, as to food, clothing, and lodging, is superior to that of multitudes of the honest poor outside; thus frequently offering an inducement instead of a discouragement to crime.

The objection sometimes urged, that prison labour would compete unfairly with honest workers outside, will be found, on examination, to be very superficial. For the prisoners, if not trained to remunerative labour, are a dead weight upon the ratepayers whilst confined, and will again be a nuisance and expense to the public when discharged. Further the number of workers in prison would, at most, be very small compared with those outside. In many foreign prisons, the strict enforcement of prison labour is found to be deterrent and preventive, as well as reformatory.

Many imprisonments, especially of poverty-stricken misdemeanants, are a heavy and wholly unnecessary burden on the community, and might be beneficially avoided by such preventive measures as making fines systematically payable by instalments, as in county-court debts. Prevention is better than cure.

In a few of the best managed of our prisons, as at Bedford, Holloway, Manchester New Bailey, Newcastle, &c., the prisoners earn from 5*l.* to 10*l.* each per annum. At many others almost nothing, as, for instance, *a farthing a day* at Exeter gaol. But the convict prisons (especially in Ireland) are far better. Some of the American prisons are wholly self-supporting, and return a net profit to the State, with excellent moral and preventive results in addition. But in the average of English prisons (good and bad together) *each prisoner costs* 30*l. per annum, and earns less than* 2*l.* Yet, to show what can be done in this country (and even by women), the inmates of the female House of Refuge at Greenheys, Manchester (under private management), earn 18*l.* each per annum."

Mr. Tallack, the secretary of the Howard Association, has sent to the daily papers a petition from convicts in Western Australia complaining of great cruelty and mismanagement by the Governor. The petition is accompanied by a corroborative letter from one of the warders themselves, and it is to be hoped the Government will look into the matter, keeping in view, of course, as they will, the consideration that such convicts cannot, as a class, be the best of characters.

MONUMENTAL.

A STATUE of Lord Clyde, by Baron Marochetti, has been set up on the eastern side of Waterloo-place, near the Duke of York's Column and opposite the Franklin Memorial. The statue is 8 ft. 3 in. in height, and represents the general standing in undress forage-jacket, with his right hand in the pocket, whilst in his left he holds the turbaned species of helmet usually worn by officers in the Indian service during the hot seasons in that part of the world, and in front of which the general's sword is suspended from the waist-belt. The statue stands on its own proper feet without any other support. The pedestal is a massive piece of workmanship. The base, some 12 ft. square, is composed of blocks of grey granite, and on the front part of this is a crowned female, said to be intended for the Empress of India, seated on a *couchant* lion, and holding in one of her hands an olive or palm branch. Behind this group is a pillar of polished red granite, the floral mouldings being in bronze, supporting the cornice and figure. The entire height from base to summit is 26 ft. The statue looks small compared with the basement, but is a good likeness and easy figure. The sire of the lion may be found in Trafalgar-square. The least satisfactory portion of the design, and this is very unsatisfactory, is the female figure, who sits weakly, with the legs crossed, and is altogether *mesquine*.

Mr. W. Day Keyworth, of Lower Belgrave-place, has just completed a statue of Andrew Marvell, which, with a view to its erection in the new town-hall, Mr. J. Widship intends to present to the corporation of Kingston-upon-Hull, the birth-place of Milton's secretary. The statue, which is 7 ft. high and of Sicilian marble, represents the patriot at the moment when he may be presumed to be rejecting the bribe offered to him by Lord Danby on behalf of the king. The sculptor cites as his authority for the features the portrait of Andrew Marvell in the British Museum, which pictures a fine handsome man in the prime of life.

WATER SUPPLY: SEWER VENTILATION.

THE Liverpool Water Committee of the town council have recommended, and the council adopted the recommendation, that the water engineer, Mr. Duncan, be requested to undertake the execution of the works in connexion with the Yarrow reservoir, the filter-beds, and the diversion of the river Douglas.

Mr. Alderman Cooper said he saw that the highest tender was for 151,000*l.* and the lowest 88,000*l.* Now, he wanted to ask the chairman of the water committee whether any communication had been made to the person who sent the lowest tender. He thought trouble might be saved by taking care, when accepting tenders, to have the usual guarantees with them for the performance of the work.

Mr. Beloe said that by some means the amounts of the tenders appeared, to their surprise, in the public newspapers. How the gentlemen of the press obtained their information he had endeavoured in vain to discover. But so it was; the tenders were put in, and the lowest tender was found to be far below the

estimate of Mr. Duncan, and he was not surprised to find that Messrs. S. Sim & Co., instead of giving the securities they otherwise would have done, declined to carry out their tender. They reserved the names of their securities, and their tender was accepted subject to those names being furnished. He thought the withdrawal of Messrs. Sim & Co. was entirely attributable to the publication of those figures in the newspapers. He had the authority of the town-clerk for saying that it was quite open for them to withdraw. The tender has not been accepted unconditionally; on the contrary, it was conditionally, on the guarantee being thought acceptable.

In March last the Liverpool corporation came to the determination to ventilate the sewers of the borough, and without loss of time the work was in rapid progress. At a meeting of the Liverpool Burial Board last week, it was stated that the number of interments during the past month were only 413, when compared with 786 in the same month of last year, showing a decrease of 373, and that ever since the sewers had been ventilated the death-rate had sensibly decreased in the borough.

The new reservoir connected with the waterworks of the town of St. Columb, in Cornwall, has just been completed. It will hold sufficient water for the use of the inhabitants for three months, in the event of no rain falling during that time. The residents seem well pleased with the prospect of having the convenience of an ample supply of water brought to their houses, and regard it as a great public boon, notwithstanding what has been said against the introduction of the Local Government Act.

THE STAGE.

Haymarket Theatre.—As *Juliet* Mrs. Scott-Siddons has made a considerable advance in public estimation. It is a very excellent performance, superior as a whole to her *Rosalind*. Several crudities observable in her acting on the first night of "Romeo and Juliet" have been overcome, and a full house every night recognises her merits. Mr. Howe plays *Mercutio* with great dash and spirit, and Mr. Kendal *Romeo* with considerable elegance. Some suitable and agreeable scenery has been painted and selected, so that the spectator has no doubt the action is going on, we will not say precisely in Verona, but at any rate in Italy. The balcony scene, with the city in the distance, is, of course, made a striking feature. Tradition points, with or without truth, to a house in a close street in Verona as the residence of old Capulet; but we make no objection to the scene-painter on the present occasion for going a little way out of town.

Lyceum.—"The Lady of Lyons," on Monday, was received with acclamation by a full house. Why, it would be hard to say, for it was certainly not well played; indeed, to tell the truth, it was played very badly. Mr. Fechter, clever actor as he is, managed to make himself look more like the young lady's father than the enthusiastic young poet-lover figured by the author. Miss Charlotte Leclercq (*Pauline*), charming in many things, is not equal to the part; and Mr. G. Jordan, who played *Beauseant*, must have fancied he was playing *Glavis*, the comic conspirator. There is very little that can be honestly praised in the production, beyond some very pretty landscape scenery, painted by the Messrs. Greive.

Bristol.—The new theatre in Park-street is progressing rapidly towards completion, though much requires to be done in the way of embellishment and decoration. The front, somewhat Italian in style, is of freestone, with Pennant columns at the entrance. The dress-circle will seat nearly 250 persons. On extraordinary occasions the corridor may be used by spectators, as it presents a full view of the stage. What about the draught?

Theatre Royal, Doncaster.—This theatre, the property of the corporation of the town, is reopened for the season, after undergoing a thorough reconstruction from the designs and superintendence of Messrs. Thomas Moore & Sons, architects, of Sunderland, who are also at present engaged upon the building of the new Theatre Royal and Opera House, Leeds, and the new Theatre Royal, Yarmouth. The builder engaged at Doncaster was Mr. Thomas Wood, of that town; decorator, Mr. Jackson, of Leeds. The modelling was by Mr. Alfred Walker, also of Leeds; the gas arrangements and sunlight, by Mr. G. L. Smith, of Birmingham; and the upholstery, by Messrs. Roberts & Wouldhave, of Leeds.

A Sweet Programme. — An American has invented a tasteful play-bill for the French theatre. The programme and names of artists are printed upon an agreeable paste by means of juice of chocolate, so that the programme can be eaten. This is a new way of having a taste for theatricals, and "devouring their discourse."

ACCIDENTS.

A FATAL accident has happened in the Strand, on the site of the new law courts, or rather in the street immediately fronting the site. A number of workmen were engaged in removing the stone pillars of the archway leading to Clement's Inn, and opposite St. Clement's Church, when the standards—two long poles, crossed—suddenly canted, and fell to the ground, striking a young man on the head, and crushing him to death. He was one of a number of persons who were standing watching the progress of the operation.

A labourer has been killed while engaged at the gasworks, King's-cross, removing the *débris* of a wall that was being knocked down. Part of the wall between the top and the bottom had been removed, the top, however, being left flush. A man who was on the top of the wall stepped inadvertently upon the part from which the underlayers of bricks had been removed, which gave way, but as he was falling a comrade caught hold of him and saved him. He, however, dropped his pickaxe, which, falling a distance of 25 ft., buried its point through the neck into the chest of the deceased. A verdict of "Accidental death," has been given in this case.

A bricklayer has been killed by a fall from a scaffold in Queen-street, Essex-road, Islington. Deceased was handing boards down from the scaffold, which was being taken down, to another bricklayer, who was standing on the ground, and when he came to the last board, instead of drawing the board toward him, and holding on to the pole while he lowered it, he lifted it up and pushed it from him, in doing which he lost his balance and fell into the street, a distance of about 11 ft. No one was to blame. A verdict of Accidental Death was also returned by the coroner's jury in this case.

Twenty houses have been burned and damaged at Rotherhithe, near the water side. The fire appears to have broken out in a bakery carried on in Rotherhithe-street. The fire swept along the street both east and west, and within half an hour twelve of the adjoining houses were in ruins. The flames swept across the street and set fire to a ship's bows and rigging, and it required the incessant exertions of the firemen to prevent it being wholly burned. Several houses in Lavender-lane were also burned down.

At St. Michael's Church, Bishop Stortford, an accident has occurred. Some years ago the large five-light plain window at the east end of the chancel was taken out and a smaller coloured one put in in its place, the interstices being rather tastelessly filled up with bricks. Workmen had been engaged in cutting away the face of the brickwork to the depth of 4 or 5 inches, and substituting flint stones to match the other parts of the wall. At the time of the accident two bricklayers were upon the scaffold engaged in filling up a portion they had cut away over the top of the window, and immediately below a row of stone coping partly supporting a foot or two of wall, the stone battlements, and a stone cross. Suddenly and without any warning the stone coping, with the superincumbent wall, battlements, &c., fell forward on to the scaffold, which all fell outwards to the road, hurling a lad who was ascending a ladder with a hod of flints on his shoulder, backwards on to the opposite side of the street, and overthrowing the iron railings and stone curbing under the window. One of the bricklayers fell upon the fallen railings and had one of his arms terribly lacerated. The other fell to the ground close to the church wall, and was partly buried by the falling *débris*. All three were taken up insensible.

At the new parish church at Stroud a shed standing in the churchyard, and close to the new church which is in process of erection, was found to be in flames. In about an hour, however, the fire burnt itself out. The shed contained all the workmen's tools, and also a considerable quantity of prepared oak timber intended for the roof of the nave. The whole was destroyed, and the loss of the timber will necessarily lead to delay in the building of the church. The loss is estimated at little short of 700*l.*, which is wholly uninsured, and will, therefore, fall upon the contractors, Messrs. Wall & Hook. The cause of the fire is not known, but it is conjectured that a cinder from the engine used in the yard may have lain smouldering, and thereby led to the catastrophe.

A fatal accident has occurred at the Normanton Station. Workmen have been pulling down the old buildings, and whilst engaged in the work a portion suddenly gave way, and, falling upon the foreman, he was buried in the *débris*.

A church spire has been destroyed by lightning at Sutton-in-Ashfield, Notts, where the parsonage-house had been struck by lightning. During the second storm the lightning struck the spire of the church at the distance of only a few yards from the scene of the previous visitation. No lives were lost, but the spire was shattered, many stones being thrown from it, and the upper portion twisted round. A slight wind will probably complete its destruction.

THE COAL-CELLARETTE.

A CAPITAL notion; and a capital name. You cannot have a coal-cellar in the club-room or the first-floor of an hotel; but you can now, thanks to Mr. Thompson, of Sloane-street, have a coal-cellarette, which will contain a very large quantity of coals, in an ornamental form on a small ground space. The coals are removed from the bottom of the cellarette, and the small being equally consumed with the large, dust and dirt are avoided. Its capacity, too, being made equal to the consumption of a whole floor, it can be used for all the fires, as well as for replenishing the scuttles for the upper floors (as in the case of large hotels), when placed in the corridors.

The form of the cellarette is that of a pedestal, the top being movable for the reception of the coals. It varies in size, is capable of holding from 84 lb. to 40 cwt., and can be mounted upon castors or rollers, rendering it easily movable.

It was patented under the title of the Londonderry, but it is more likely to become known under its second title,—Thompson's Coal-Cellarette, which at once explains its purpose. We are not surprised to hear that it is in use at the Bank of England and many other large establishments.

LEEDS MECHANICS' INSTITUTION AND SCHOOL OF ART.

THE new building in Leeds, intended to be occupied as the Mechanics' Institution and School of Art, is making rapid progress towards completion, and will be opened, it is expected, in May next. The first stone was laid on the 31st of August, 1865. It will provide accommodation for the following departments:—

1. The Institution department, offering a well-selected library of upwards of 12,000 volumes; sessional lectures, illustrative of science, literature, and the arts; a news-room, well supplied with reviews, magazines, daily and weekly newspapers.

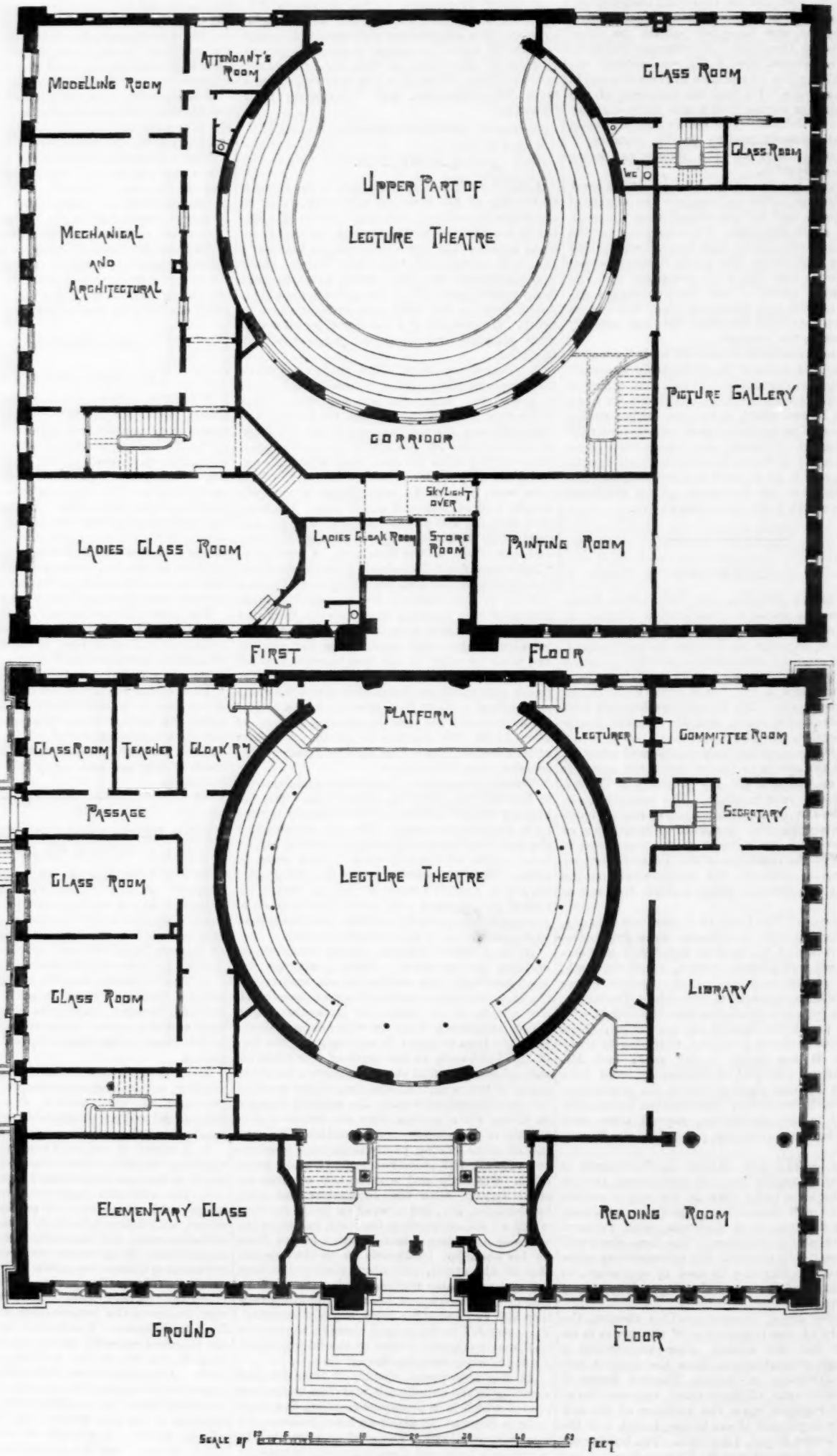
2. Evening classes, for instruction in writing, reading, arithmetic, book-keeping, the higher branches of mathematics, French, German, mechanical and architectural drawing, and chemistry, both theoretical and manufacturing.

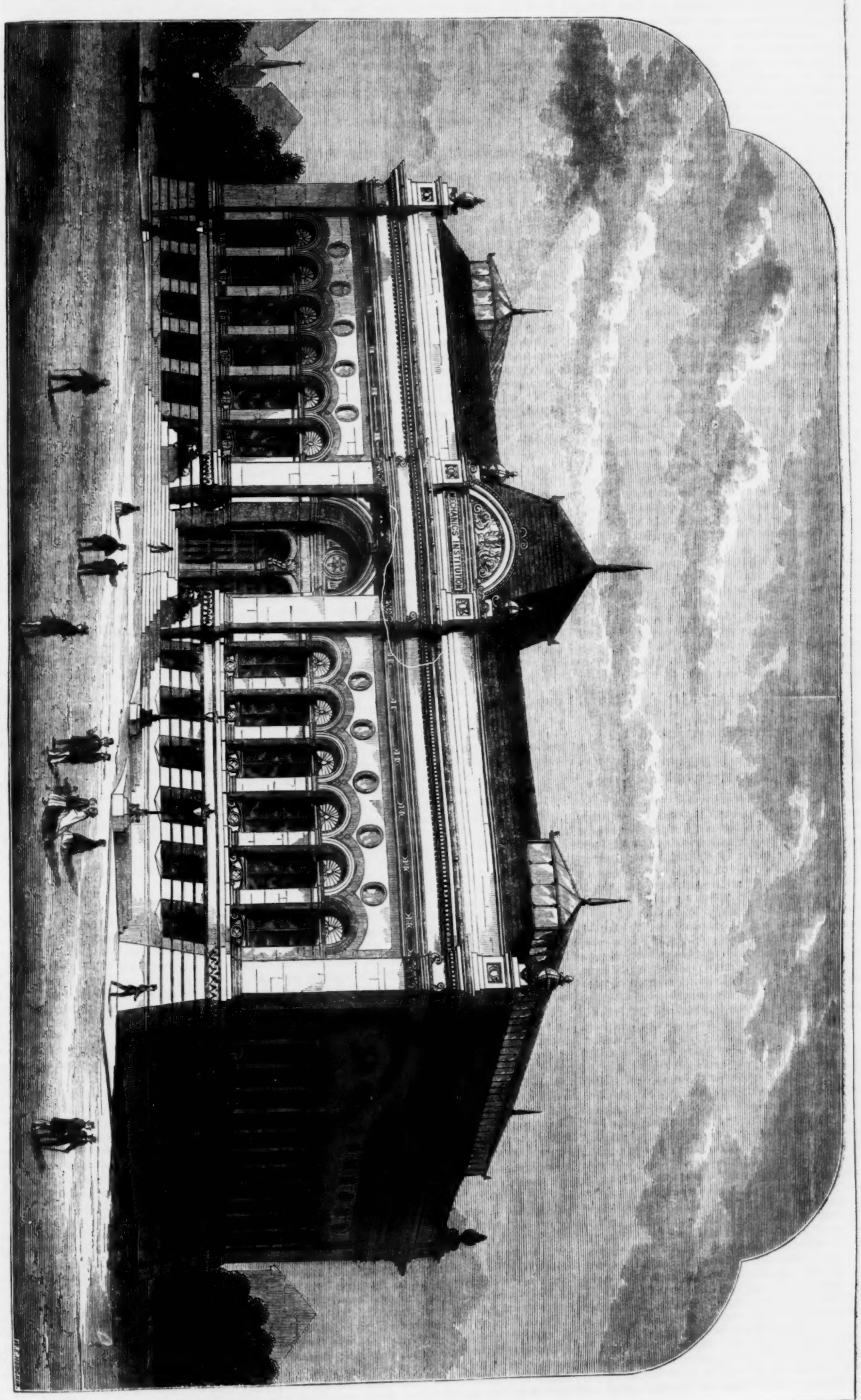
3. A school of art, ably conducted by trained masters, affording instruction to above 2,000 pupils in the central and other schools.

4. The scholastic departments,—viz., a girls' school, with upwards of 130 pupils; and a boys' school, with 190 pupils: both these schools are self-supporting, and enable the committee, by the employment of the same teachers, to conduct the evening classes for males and females, at a comparatively small expense.

For the first-mentioned department the principal feature is the lecture-room, a circular hall, 73 ft. in diameter. The room is approached by the principal entrance on the ground-floor, and rises to the top of the building, a height of 52 ft. An ornamental coved ceiling, a roof of a somewhat novel construction, with windows immediately below it, completes the architectural features of this hall, which, with the assistance of the gallery, is capable of accommodating 1,500 persons. On the same floor with this hall are situated the reading-room and library, and large, well-adapted rooms for the purposes of

LEEDS MECHANICS' INSTITUTION AND SCHOOL OF ART.





LEEDS NEW MECHANICS' INSTITUTION AND SCHOOL OF ART.—MR. CUTHBERT BRODRICK, ARCHITECT.

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the Ladies' Educational Institution. The boys' school is provided in the south end of the basement floor, while on the north are refreshment-rooms and porter's residence. A tea-room is also placed in this part of the building. It is immediately below the lecture-hall, and, like that room, it is circular—the diameter being equally large, and the height 16 ft.

Two rooms for the accommodation of the science classes are to be found on the first and second floors, but the greater part of these portions of the erection is entirely devoted to the School of Art, the importance of which in a large manufacturing town like Leeds it is impossible to over-estimate. On the first floor the following rooms belonging to the school have been placed: — The ladies' class-room, the mechanical and architectural room, the modelling-room, the painting-room, and the picture-gallery. The proportions of the last-named part of the building are as follow:—Length 81 ft., breadth 28 ft., height 24 ft. It is intended to establish in this gallery, partly out of the profits of the National Fine Art Exhibition to be held in Leeds next year, and partly, it is to be hoped, from the munificence of the inhabitants, a fine art collection, which will form one of the permanent, as it will be one of the most valuable, institutions of the town. Mr. Walter Smith, we may mention, is the head-master of the Leeds School of Art. On the second floor the only part available is the south side, the centre being occupied with the top of the lecture-hall, and the north end with a similar portion of the painting-room and picture-gallery; but here space has been found for a suite of boys' class-rooms, including lecture-room, elementary class-room, and masters'-room.

The architect of the building is Mr. Cuthbert Brodrick, the architect of the Leeds Town Hall. The style of architecture adopted is Italian. The west and south fronts are of stone—the principal entrance, approached by a circular staircase, being in the first-named. The lecture-hall, as we have said, is entered directly from the doorway, whilst to the right and left are the reading-room and library, and the rooms appropriated to the Leeds Educational Institution. Access to the School of Art can also be gained from this part of the building, but a separate entrance is provided on the north side. The contractor for the masonry is Mr. D. Nichols, Leeds; for the joiner's-work, Mr. W. Britton, Leeds; for the plumber's-work, Mr. John Hall, Leeds; for the painting, Mr. W. Nelson, Leeds; for the iron-founding, Messrs. Nelson & Son, Leeds; for the slating-work, Messrs. Dauber & Son, Hull; for the stone-carving, Mr. Joseph Holmes, Leeds; and the whole is being carried on under the direction of Mr. J. T. Brown, the clerk of the works. The cost will be about 22,000*l.*

FROM SCOTLAND.

Glasgow.—A meeting of the Glasgow City Improvement Trustees has been held to consider a report of their committee, which proposed that for the second year of the operation of the Act the assessment should be limited to 4d. in the pound. The adoption of the report having been moved and seconded, Mr. Bain proposed an amendment, to the effect that the committee be instructed to select a block of buildings for reconstruction; that in the meantime the trustees delay granting powers to borrow more than 30,000*l.*, or to purchase property except in the block to be reconstructed; and that the assessment be at the rate of 3d. per pound. Another amendment was proposed by Mr. Lang, enjoining the committee to make no more purchases and borrow no more money without consulting the trustees, and limiting the rate to 2d. per pound; while Mr. Wm. Brown moved for the restriction of the rate to 2d., and of the borrowing powers to 20,000*l.*, with an instruction to the committee to confine their efforts in the meantime to a certain specified block. After discussion, Mr. Lang's amendment was withdrawn in favour of Mr. Brown's. On a division, Mr. Bain's amendment was carried against Mr. Brown's by twenty-four votes to five; but when pitted against the motion, obtained only nine votes against thirty-one. The report was accordingly adopted.

Peebles.—The new waterworks have been inaugurated with local rejoicings.

Machar (Aberdeenshire).—Lord Provost Nicol, of Aberdeen, and Mr. A. Forbes Irvine, of Drum, convener of the county, forwarded a joint application to her Majesty on behalf of the committee for the restoration of Old Machar Cathedral. A letter has just been received from Sir T. M. Biddulph stating that "her Majesty learns with pleasure that an endeavour is being made to preserve and restore such an interesting structure." He is also desired to forward a cheque for 100*l.* whenever the committee feels justified in commencing the work.

THE SOCIETY OF ENGINEERS.

A LARGE party of members and associates of the Society of Engineers visited the extensive engineering works of Messrs. J. Penn & Son, at Greenwich, last week, by permission of the proprietors. Among the company were Mr. W. H. Le Feuvre (president of the Society), Messrs. William Adams, F. W. Bryant, Willian Mac George, Vaughan Pendred, George Waller, Francis E. Houghton, Thomas Cargill, P. Thorn, A. Thorn, Lewis Olrick, W. H. Maw, F. C. Young, Alfred Williams (honorary secretary), and Perry F. Nursey (the auditor of the Society), &c. On arriving at the works, the visitors were told off into three parties, each of which was conducted over the works by gentlemen connected with the establishment, who explained the various works going forward in the several departments. After an instructive visit of inspection, the members returned to town, and a number of them dined together at the Bridge House Hotel, London Bridge, in the evening.

THE ARCHITECT OF THE HOUSES OF PARLIAMENT.

SIR,—We provincial pigmies of the profession, pursuing our petty projects amid the deep obscurity of commercial communities, scarce lifting our eyes from our dingy drawing-boards, save when we open both wide in admiration and amaze as some metropolitan Titan deigns to alight among us and undertake some *great* commission, which, divided, would be a boon indeed to any six of us nobodies; or when we lift *one* eye perhaps with a hungry glare to note the number of "jobs" which fall to the lot of some lucky local farmer of draughtsmen, acquiring the would-be semblance of our craft by cleverly joining his experience at the bench with the handiwork of his clerks;—we, thus drudging through a half century, perhaps, of inglorious toil till Time lays us unsung in the earth we have *not* loaded with our works, yet in our pilgrimage glancing anon at the London papers over our chop and small beer, cannot but fix what we venture to call our minds from time to time on the matters which stir the Olympian heights of architecture.

Thus we, the pigmies, presume to think a little about the battle waged or waging between a living knight of the holy Roman Empire and the shade of a whilom knight of this British Empire, and eke a giant in architecture; and it seems to us in our pigmy judgment (if allowed the term) that, while loyal to his father's memory, the Roman knight is seeking to prove too much, and that the no less loyal sons of our own much honoured knight are willing to admit too little. It is scarcely seemly, we fancy, that this debate over the names of two so highly distinguished artists should on either hand run into anything like bitterness; and with such knowledge of the merits of the question as some acquaintance with works of each and some memory of the events referred to afford us, we pigmies think that the fame of both architects is safe with their countrymen without any ungenerous endeavours to exalt that of either at the expense of the other. As to the great building in debate, it was always, as we remember, admitted that the architect derived valuable aid from his gifted coadjutor, and it was never in the lifetime of the latter asserted, as far as we can learn, that he claimed more merit in the matter than thus accorded him. If from the letters referred to by his son it appears that he gave more aid than has been generally supposed, we cannot see that the reputation of the friend he assisted can be damaged by admitting the fact.

The plan of the building is acknowledged to be Barry's; the style is surely not Pugin's, but of a phase of Gothic work which he and his school always decried. The composition is derived from the plan, and resembles no work we know of Pugin's. The working out of much of the detail was always acknowledged to be due to his unique skill; and by the partial quotations published from the correspondence, it would appear that the composition of some *compartments* must also have been entrusted to him, but we do not see that they can prove more. We all would sympathize with the feelings of a son seeking to have justice done to his father's memory, but that of Pugin needs no better monument than his *known* works, architectural and literary; and all who enter on such a controversy as that in question should surely, we think, beware lest the fame they seek to enhance be not injured rather than benefited by their endeavours, which cannot but be the case should a shade of egotism or self-love appear to mingle in the efforts made on either side to enlist the sympathies of the public.

AN OBSCURE PROVINCIAL.

GOVERNMENT ARCHITECTS AND GOVERNMENT SURVEYORS.

SIR,—In the *Builder* of the 3rd ult. I find a reference to the payment of architects as employed by Government at the Houses of Parliament, &c.; also an account of a deputation to her Majesty's First Commissioner of Works, who evidently is not aware of the usages of his office, sprung up of late years to suit individuals and a clique, to the serious detriment of the Crown property and of the public purse.

Objection is made to the proper payment of a first-rate architect. Now, I would ask, why do the Government pay a surveyor 1,000*l.* a year, standing fee, and per-centages in addition, for a few hours' work each week? This is a practice that wants inquiring into. The present surveyor is also allowed to do private practice *for the builders*, and occasionally dabbles in architecture.

There are plenty of equally able surveyors who would devote *all their time* to the duties of the office for less money. The practice there as at present pursued certainly needs revision. Moreover, the works required to be done for her Majesty's Office of Works ought to be put to public or partial competition annually, and fairly, and not smuggled to one firm only.

The works at the new Foreign and India Offices want looking to.

A LONDON SURVEYOR.

WAGES OF BRICKLAYERS' LABOURERS IN AMERICA.

A LETTER in the *Builder* for September 14th, with the initials "H. N. H.," upon the subject of emigration, and the inducements held out in the United States for the removal of our building operations to a market where their labours would be more remunerative, requires a few corrections, which, as an architect of many years' practice in America, I venture to think I can supply.

In the first place, "H. N. H." has made a mistake in his estimate of the present money value of the "dollar," which he states as 4s. 4d., a price it never could reach—4s. 2d. being rather more than its par value when in gold; but it must be understood that the current value of the dollar is now only about 3s. 6d., and has been less, so that his statement of the rate of wages must be qualified accordingly.

Had "H. N. H." resided in New York or Philadelphia, he would never have asserted that an Irish labourer can live "very nearly as cheaply there as in London." Some years ago, when the Irish and German emigrants were allowed to take temporary possession of unoccupied tracts of land not yet reached by the onward stretch of building operations, and to build their hovels thereon, such, by saving house-rent, might have been the case; but it is so no longer—and to be at all decently housed, even in the humblest manner, requires an expenditure for rent that makes a considerable hole in the wages received at the end of the week. As to cost of living, a recent letter from New York gives the following prices:—Coal, 5*l.* 5s. per ton (of 2,000 lb. only); flour, 4*l.* to 5*l.* per barrel (which seven or eight years ago was, to my knowledge, but 1*l.* to 1*l.* 10s.); butter, 2s. 6d. per lb.; so that the apparently increased wages are quickly swallowed up by the disbursements for the bare necessities of life, to say nothing of the luxuries.

Another error that "H. N. H." has fallen into is in regard to the price of building-land in the principal cities of the United States. The rise in the value of real estate there is something

perfectly wonderful: thus it is no uncommon thing to find a house built upon a lot in a new part of the city and sold for a fair price, and the sum realised insufficient in two years' time to buy the land only of the adjoining lots. Builders in New York, Philadelphia, and Boston make their successful speculations out of the increased value of the *land*, rather than by legitimate profit on the cost of building; in simple fact building by them is usually considered as the means whereby the value of the land is made to rise, rather than as the end for which the ground was originally purchased. Again, the houses are far more expensive in themselves than the writer seems to suppose. The house he alludes to in Logan-square, Philadelphia, which he considers so dear at 25,000 dollars, is in all probability 70 ft. to 80 ft. in depth, the interior most sumptuous in its arrangements, bath-rooms on every floor, and finished in a manner vastly superior to the average of the residences about Lancaster-gate or any other west-end suburban situation. Furthermore, of this 25,000 dollars, at least 10,000, and probably 12,500, would be the value of the land. The same of the house he alludes to as "an elegant cut-stone mansion, with 40 ft. front on Chesnut-street West, Philadelphia, *with a garden 240 ft. deep*," and which appears so extravagantly high in price at 30,000 dollars, probably is worth in land alone at least one-third of that sum. A "new dwelling with ten rooms" is in New York or Philadelphia a very different thing from our "ordinary ten-roomed house," and in a good situation 9,550 dollars would be a very reasonable price. So great, in fact, is the value of land in the fashionable parts of New York that numbers of houses are built upon "half-lots,"—that is, with a frontage of 12½ ft. only, and the utmost ingenuity is shown in making these bowling-alleys of houses comfortably habitable. "H. N. H." will probably scarcely believe the fact that as much as 17,000 dollars has been paid for such houses recently in New York. It is not, therefore, the legitimate profit on building that enables a master to pay such apparently high wages to labourers, so much as the extravagant rise that has taken place in everything, wages included.

Having offered these few corrections, the experience of several years spent in the country fully justifies me in agreeing with the writer as to the real position of a labourer in America as compared with what it is in England. The thrifty, long-headed man will thrive anywhere *if he has a chance*; and in these words is the explanation of the whole matter: he has *more chances* in America than he can have here. His wages to begin with are somewhat larger, and he may make his expenses less, principally because he can, if he pleases, dispense with the customary lavish outlay in "allowances" and beer, which I notice forms so heavy an item in our workmen's disbursements at home. Then, as he saves a little money, opportunities of prudent investment at high rates of interest are easy to find. In all probability he will own a "lot" (as building sites are called), and by selling at the rise, and buying again elsewhere, the shrewd labourer finds himself in a few years the possessor of a fair independence; and though he may not himself be able to either read or write, he has sense enough to value these blessings for his children, which, thanks to the noble educational institutions of America he can obtain of the very highest excellence for absolutely nothing (in the state of Massachusetts, education, during at least a portion of the year, is not only offered gratuitously, but is even compulsory upon parents). So in the second generation, the thrifty father's savings bear good fruit, and numbers of successful men can be pointed out whose fathers or grandfathers first came to America as builders' or carpenters' labourers. One curious observation comes to my memory. The Irish labourer on first arriving is a zealous "son of the Church," and gives of his earnings liberally at the bidding of his spiritual director; but after awhile, as he finds the value of money, he becomes cunning and parsimonious, whilst his children grow up less and less tightly bound to the demands of the priest; so that, although the Roman Church in America is enormous both in number and influence, it is supported mainly by the influx of emigration. The second and third generation become but lukewarm, and the members little more than nominally Romanists, although too indifferent to become proselytes in any great number of any other creed.

To return to the general question. This much may be said,—The skilled workman need not emigrate on score of wages only. He may undoubtedly find more scope for the establishment in life of his children, and better interest for his savings; but the mere labourer will be very much better paid in America than he can be at home; and, if he is prudent, temperate, has an industrious, sensible wife, and will adapt himself to the habits and climate of his new country, he will be sure to get on. But this success must entirely depend upon himself. As before said, he will have more chances there than here, and his future welfare will be in proportion to the good use he makes of them. G. W.

TOWN SURVEYORS.

PERMIT me to add one observation to the excellent article hereon in your last impression (p. 679). A slight change in the terms upon which the office is held would effect a most salutary improvement in the status of the officer. At present town surveyors are appointed *during pleasure*, and are liable to be dismissed by any breath of the local political weathercock. They should be appointed *during good behaviour*, then they could feel as independent in the honest discharge of the duties of their office as the coroners of England do, who are so appointed. The law protects persons who hold offices *during good behaviour*, and if any one public officer desires that protection more than another it is A TOWN SURVEYOR.

ARCHITECTS AND THEIR ASSISTANTS.

WE have received a letter from an architectural draughtsman, stating, with reference to a building of some importance now on the eve of completion in Southwark under an architect, that he, the draughtsman, designed such and such portions of it, and that the rest only is the architect's own work; and he gravely asks us "to favour him with a corner in our paper to that effect." If we gave his name it would be for the purpose of making other architects aware of the exact terms on which his assistance is to be had.

A RESTORED ROOD-LOFT DOOR.

SIR,—As a parallel case to the *papier-mâché* bosses in Romsey Abbey Church, mentioned by your correspondent "C.," I beg to say that, at Leadenham Church, Lincolnshire, the rood-loft door is *restored* by stretching some canvas on a wooden frame fitting the opening, and colouring it to imitate a massive door; the whole being nicely varnished. TH. B.

THE CLOSE AT EXETER.

SIR,—I hear, on good authority, that a brick house of the commonest and most ugly description, is at once to be erected, in the Cathedral Close at Exeter, from the design of a national schoolmaster. Surely, sir, there should be taste enough in the capital of the west country to prevent the few remains of antiquity which have been allowed to exist there from being ruthlessly swept away.

MONKTON.

"SINGLE-SPAN CHURCHES."

SIR,—What is the object of the poke at me in the concluding paragraph of the article on the above, in your impression of the 7th? I can assure the writer that I am not so far troubled with self-complacency about my work at St. Walburge's, or anywhere else, as to need it. On the other hand, I do not feel to be so far obfuscated as to receive the dictum—that a roof covers a hall, and a vault a church! Formerly I was assailed because I had built so unusual a thing as a large single-span church; now, however, as the hunters after, and slaves of, precedent, have found numerous old examples, the indictment is changed. I shall be content to wait again, until further explorations, or the acquirement of vision shall have revealed that the men of the Middle Ages, taking common sense for their guide, as well as we, and when they had attained the power of making large and fine roofs of wood, did not hesitate to cover churches with them as well as halls; nay, I believe that this very Westminster Hall was first covered with a vault. So much for the dictum quoted above.

The writer says that "few of the modern attempts to revive this form of church have been successful," and then seems to derive pleasure in insinuating that mine is not of the few. Now, if I am to trust the general verdict, and the testimony of those who use the church, it is a success, as least as much so as one cares to go in for in this age of mediocrity and exaltation of small geniuses, and when the very selected chiefs of our profession are denounced in one universal chorus of critics as imbecile and incompetent.

I suppose the similarity of treatment of a similar subject, namely, the covering in of a large and undivided area, constitutes in the mind of the writer the exact reproduction of Westminster Hall. Shall we anticipate an exact reproduction of the churches at Angers in the first vaulted single-span church to be built after this article?

Surely it ought to be obvious to any one who is an architect, or knows what architecture is, that to design a church of 55 ft. span and 165 ft. long, with sufficient buttress and no more, sufficient light and no more, with a roof of almost entirely novel combination of the principal members, sufficiently strong and no more; and in the end to gain from an adverse critic the extravagant encomium that it "looks exactly like a reproduction of Westminster Hall;" and to do all this at an outlay that would barely serve with some men to reproduce two or three of the principals of the roof of that same hall, is as great an effort of skill, or greater, than to carry out the ordinary nave and aisle substitute. Let it be, that a little modesty may creep in, and teach us that there are labour and merit in many paths, and not alone in that which we ourselves choose or chance to pursue. JOSH. A. HANSOM.

*** Mr. Hansom sees more in the observation than it was intended to convey. The "poke," as Mr. Hansom terms it, had no occult motive. The writer simply expressed his opinion that the church at Preston is scarcely ecclesiastical in appearance, and, right or wrong, is of that opinion still. We are not likely to have assailed Mr. Hansom for building a single-span church. The conductor of this journal early built a single-span church,—St. Mary's, West Brompton,—and the value of the form has been often urged in these pages.

THE MANAGEMENT OF COMPETITIONS.

WE mentioned last week that the proposal in the case of the Hayling Park competition, to leave the decision to the competitors themselves, had been found unworkable, as we expected would be the case. It may be worth while, for the sake of future essayists on the best mode of managing competition, to point out one of the causes of failure in the present case. It had been proposed that the competitors should not vote for their own designs, but should have one vote each for such of the other designs as they considered entitled to the first, second, and third premiums, and voting papers were prepared to carry out this mode of selection, with all due secrecy and impartiality. The paper was to be signed "Author of" such or such design. Neither the owner of the estate, who suggested this scheme, nor his coadjutors, however, appear to have contemplated that which in fact took place, namely, that although the designs were sent in anonymously, and with the authors' names in sealed envelopes, it was obvious, on an inspection of the drawings, that one, if not two, gentlemen had sent in *three* designs under different mottoes, and three or four other gentlemen *two* designs each. The chairman at the meeting adverted to this fact, and suggested that, as it might be supposed that those competitors who had submitted more than one design would obtain an unfair advantage by a plurality of votes, it might perhaps, be expedient to put it to them as a point of honour to state which of their designs they would elect to compete with, and withdraw the other or others from competition.

This led to an animated discussion. The designs had been sent from London, Liverpool, Bristol, Newcastle-on-Tyne, North Wales, Surrey, and other southern counties, Ireland, and other places, far and wide apart. Nearly twenty of the competitors attended the meeting; and, whilst the suggestion of the chairman met with some support, it was on the other hand contended that those gentlemen who had taken the pains to prepare three designs, should not be deprived of a corresponding number of chances for the premiums. Eventually it was unanimously resolved to adopt a proviso, in the conditions, that in case of any dispute, the premiums should be awarded by Mr. Longcroft.

ARCHITECTS' RESPONSIBILITIES.

A CASE of some importance as between architects, contractors, and employers has recently been the subject of investigation in Leeds, between Mr. Henry Hood, of Pepper Hall, York, and Messrs. Dobson & Chorley, architects, Leeds, each party appearing as plaintiff against the other. The actions were originally brought in the Court of Common Pleas. It was, however, agreed to submit the whole of the matters in dispute to the arbitration of Mr. J. A. Picton, architect.

It appears that in the year 1861, Mr. Hood purchased an estate in Yorkshire, known as the Pepper Hall Estate, and in the autumn of that year sought the services of Messrs. Dobson & Chorley who undertook to prepare plans and specifications, and superintend the alterations for the usual five per cent. commission. Plans, &c., were accordingly prepared and approved of, and the works let in September and October, in the same year, to several contractors, whose estimates in the aggregate amounted to over 13,000*l*. Messrs. Longley, Brothers, of Leeds,

were contractors for the masons' and bricklayers' work; Mr. J. Hall Thorp, of Leeds, for the joiners' work; and Messrs. Russell & Sons, Darlington, for the plumbers' work. Mr. W. Freeman, of Ripley, was appointed clerk of the works. The works were completed in 1864, and the total cost, as certified by the architects, and on which they charged commission, exceeded 27,000*l*. The accounts for extra work were sent in by the several contractors to Messrs. Dobson & Chorley, who certified the same. When, however, they came into Mr. Hood's possession, which was not until they were certified, and he became aware of the very large sums which he had to pay for extra work, he had the whole of the accounts investigated; and notwithstanding they had been certified, it was discovered that certificates had been given for work which had not been executed in accordance with the plans and specification. Materials of less quantity and inferior quality than specified had been permitted to be used, and in the measurement of bricklayers, masons, joiners, and plumbers extra-work quantities were certified, which turned out on investigation to be greatly in excess of the work actually done. Messrs. Dobson & Chorley, on being appealed to, refused to entertain Mr. Hood's objections to the accounts, and supported the contractors in their several claims for the balances certified. Acting, therefore, under professional advice, Mr. Hood had no alternative but to pay those exorbitant charges, and seek his remedy by an action at law against the architects. In the meantime Messrs. Dobson & Chorley furnished Mr. Hood with their accounts for preparing plans, superintending the works, and sundry other charges, amounting to 1,600*l*. Towards which they had been paid about 1,300*l*., and Mr. Hood, considering the manner in which Dobson & Chorley had neglected to exercise proper care and supervision in the contractors' accounts, as well as several unprofessional extra charges in their own account, proposed to deduct about one-half of the balance claimed, or submit the matters in dispute to the decision of some gentleman in the law or their own profession. To this proposal Messrs. Dobson & Chorley refused to listen, and commenced proceedings for the recovery of their balance. Mr. Hood at once paid 150*l*. into court, and, under the advice of counsel, commenced a cross action for neglect, and consequential damages on the grounds before stated.

The investigation extended over a period of eleven days, and a considerable amount of evidence was tendered on both sides. On the part of Messrs. Dobson & Chorley, it was contended that, so far as their account for professional charges was concerned, they were entitled to be paid the full amount of the balance claimed, and that their charges were based on a scale, and under the sanction of the Royal and other Institutions of British Architects. On the part of Mr. Hood, it was shown that Dobson & Chorley had charged commission on works for which they had not made plans and designs, and were not consulted, and also on alterations carried out long after they had ceased to attend and supervise the works. Evidence was also given, on the part of Mr. Hood, to show that in the contract work the plans and specifications had not been complied with; that timber of inferior quality, and of less dimensions than specified, had been used; that the brickwork was very defective; and that lead of lighter quality, and less dimensions than specified, had, with one or two exceptions, been used throughout the whole of the buildings. To these allegations Dobson & Chorley pleaded, that so far as the contract work was concerned, the clerk of works, and not themselves, was liable to Mr. Hood, and that they, as architects, were consequently absolved from liability; and as to the excessive measurements allowed in the lead, brick, and stone work, it appeared from the evidence of Mr. Chorley, who measured the work, that he had in most instances taken the word of Mr. Russell as to the correctness of the lead, both as to thickness and quantity; and the same from Longley Brothers as to the brick and stone work, both of which turned out incorrect.

The arbitrator has awarded to Messrs. Dobson & Chorley—plaintiffs in the first action—the sum of 9*l*. 18s. 1½d. over and above the sum of 150*l*. paid into court; and he further awards to Mr. Hood—plaintiff in the second action—the sum of 265*l*. 14s. 11d. Each party to pay their own costs, except as to a trifling amount.

DIMENSIONS OF CHURCHES.

In our volume for 1864 * will be found a communication from Mr. E. B. Denison, giving the dimensions of a considerable number of our cathedrals and churches. As a supplement to this, Mr. Samuel Sandars has made the following list. Mr. Sandars writes:—

"I do not extend the list to churches with an area of less than 8,000 square feet. This limit excludes several interesting churches; for example, St. Andrew's, Heckington, Lincolnshire, with an area of 7,900 square feet; St. Mary's, Ottery, Devonshire, like Exeter Cathedral, with transepts formed by a tower on either side, and also groined throughout, area, 7,500 square feet; and St. Patrick's, Patrington, which possesses eastern and western aisles to the transepts, area, 6,734 square feet.

In reference to the churches in the accompanying list, I may remark the Glasgow, Kirkwall, and St. Cross are vaulted throughout. St. Patrick's is partly vaulted; Hexham and Milton are without naves. Malvern has no south transept. Austin Friars, London, and Leominster, are the naves of large cruciform churches. Melton Mowbray and Faversham have east and west aisles to the transepts; the former also possesses a western porch. St. James, Bury St. Edmund's, is without a steeple: the adjoining Norman gateway serves as a substitute. The tower at Beccles, Suffolk, stands detached at some distance from the church. St. Cuthbert's, Wells, has five avenues, or aisles, and Sleaford and St. Martin's, Leicester, have four; the addition to the former is recent; the lofty steeple of the latter, just completed, replaces a far less imposing structure. Long Melford has a large, aisled lady chapel, which is not included in its dimensions as given in the list. The choir and transepts of St. John's, Chester, have been shortened, and Great Grimsby has been still more mutilated. I may add, that at Glasgow the transepts do not project beyond the line of the walls of the nave, and that its height and that of Kirkwall are, relatively to the breadth of their avenues, greater than is usual in this country. In the latter church, the proportion of the breadth to the height is 1 to 3. Croydon Church has been gutted by fire."

As in Mr. Denison's list the letter S denotes a spire; the letter C that the steeple, whether tower or spire, stands in a central position: with no letter prefixed, a tower only is understood.

Perhaps some of our readers can give the dimensions of the following large churches:—St. Peter's, Sheffield; St. Giles's, Wrexham; Ashbourn, Derbyshire; St. Helen's, Abingdon; St. Mary's, Shrewsbury; Soham, Cambridgeshire; Witney, Oxfordshire; and Terrington St. Clement's, Norfolk.

Church.	Area in Square Feet.	Internal Length.	Internal Width.	Transept Length.	Height of Roof or Vaulting.	Height of Tower or Spire.
Glasgow Cathedral	26,400	319	63	73	85	s. 225 c.
St. Patrick's Cathedral, Dublin	20,010	300	67	157	—	s. 223
St. Giles, Edinburgh	14,600	206	68	129	—	s. 121 c.
St. Mary, Bury St. Edmund's	14,024	213	68	—	60	—
Kilkenny Cathedral, Ireland	13,706	212	60	117	44	100
Hexham Priory, Northumberland	13,645	150	51	156	—	100 c.
Maidstone, Kent	13,500	168	91	—	—	80
St. Mary, Warwick	13,420	180	66	107	42	174
Leominster, Herefordshire	12,915	123	105	—	50	99
Austinfriars, London	12,699	153	83	—	—	—
Halifax, Yorkshire	12,564	175	66	—	—	117
Brecon Priory, Brecknockshire	12,498	198	60	102	—	— c.
St. James, Bury St. Edmund's	12,138	193	69	—	—	90
Malvern Priory, Worcestershire	11,650	177	63	85	63	124 c.
Stratford-on-Avon, Warwickshire	11,484	197	68	94	50	s. 163 c.
Kirkwall Cathedral, Orkneys	11,200	220	45	88	54	140 c.
Faversham, Kent	11,060	160	65	125	—	—
St. Martin's, Leicester	11,030	165	85	85	—	s. 218 c.
Lowestoft, Suffolk	10,840	182	62	—	43	s. 120 c.
Luton, Bedfordshire	10,500	174	57	100	40	90
Armagh Cathedral	10,400	183	60	119	—	s. 150 c.
Rye, Sussex	10,226	159	60	77	—	— c.
Dorchester Abbey, Oxon	10,216	183	69	—	—	—
St. Mary's, Leicester	10,142	152	76	—	—	s. 183
St. Margaret's, Leicester	10,080	180	72	—	—	130
Chesterfield, Derbyshire	9,960	168	59	109	—	s. 230 c.
Melton Mowbray, Leicestershire	9,717	163	56	117	—	110 c.
Lavenham, Suffolk	9,668	140	68	—	—	141
Long Melford, Suffolk	9,486	153	62	—	41	—
Milton Abbey, Dorsetshire	9,432	132	61	108	55	116 c.
Christ Church, Dublin	9,360	220	38	90	—	— c.
St. Cuthbert's, Wells	9,300	160	50	84	—	140
Beccles, Suffolk	9,270	148	62	—	—	92ac.
St. Cross, Winchester	9,240	125	65	115	—	— c.
Croydon, Surrey	9,134	130	74	—	—	—
St. John's, Chester	9,088	128	71	71	—	150
Nantwich, Cheshire	8,976	165	57	117	50	108 c.
Headon, Yorkshire	8,693	168	49	103	—	129 c.
Great St. Mary, Cambridge	8,380	142	66	—	—	130
Sleaford, Lincolnshire	8,364	146	78	87	—	s. 144
St. Mary's, Oxford	8,198	168	55	—	48	s. 206
Great Grimsby, Lincolnshire	8,140	144	60	90	—	— c.

* Vol. xxii., p. 954.

THE PLANS FOR WORKING MEN'S DWELLINGS, LIVERPOOL.

Mr. Samuelson, in the local Health Committee, having inquired what was being done with regard to the working men's dwellings;—

The Chairman said the matter was referred at the last meeting to the borough engineer, the town-clerk, and Dr. Trench.

In answer to a question,

Mr. Newlands, borough engineer, said he thought he could go through the plans which had been sent in in ten weeks. With three assistants he had made an examination of a plan yesterday, and it took them three hours to go through it. There were seventy-four plans.

After some further conversation, Mr. Alderman Dover threw out a suggestion that Mr. Rathbone's sub-committee should be called together to consider what course it would be best to pursue in reference to the plans.

Mr. Newlands interposed, however, and said he intended to send Mr. Rathbone a statement showing the amount of labour required in examining the plans.

The question was not pursued further.

THE CORRECTORS OF THE PRESS.

A meeting of the London "Readers" was held on Tuesday last, at the Salisbury Hotel, to consider the means of improving their position, and to adopt a memorial to the master printers. Mr. Charles Dickens presided. There were present about 300 "readers" from the principal printing-offices of London, and two resolutions were passed, one expressing the opinion of the meeting that the services of the London readers were not adequately remunerated; and the other adopting the memorial to employers, asking for an increase of 10 per cent. on the present salaries, and stating, in extremely fair and moderate language, and to the effect given above, the reasons why the application was made.

We cordially agree with Mr. Dickens and the other speakers who urged the value of the services of "readers" in printing-offices, not merely to their employers, but to all who are in any way connected with the press. The "reader" is too frequently ignored, except for blame. Little consideration is given to the difficulties under which he performs his thankless duties.

We have often mentioned the insanitary "closets" in which many are immured for very long days (and too often nights also), in a most poisonous atmosphere; but in addition to this their work is nearly always performed under great pressure, the tendency being to cram them with more work than can be thoughtfully accomplished in a given time, while they are required to grasp at a glance the meaning of every jumble which a careless writer may inflict upon the printer. We may look now to hear of some improvement in their position.

THE NEW WORKHOUSE FOR ST. MARTIN'S-IN-THE-FIELDS.

On Monday, at the meeting of the Guardians, Mr. Cobbett, in the chair, Mr. Barton, pursuant to notice, moved, that a portion of the resolution of the Board, of the 4th inst., relating to the acceptance by the Board, of the plans of Mr. Cross, be rescinded. Mr. Barton said he brought forward the motion because he thought that the decision of the chairman, at the special meeting at which the plan was accepted, was illegal, as many of the guardians were absent, it being generally understood that the meeting would only select and not decide upon any plan.

Mr. Scott seconded the motion. He said he was the mover of the resolution convening the special meeting, and he intended that the meeting should confer upon the plans and not decide, and he hoped the matter would now be fairly considered.

Some further discussion having taken place, the motion was put and carried by 8 to 4; and it was then resolved that the Board, at its next meeting, should select and decide upon a plan for the new workhouse.

PROCEEDINGS UNDER THE SANITARY ACT.

At the Thames Police Court, Mrs. Caroline Smithers appeared to answer a summons issued against her, by direction of the Board of Works for the Poplar district, for not having complied with Board's order to carry out certain sanitary works at six houses, situated at Hunt's-row, Poplar.

Mr. Layton, jun., appeared for the Board, and stated that the proceedings were taken under the authority of the Sanitary Act, and the regulations of the Board approved by her Majesty's Principal Secretary of State. The defendant was the owner of six houses, at Hunt's-row, Poplar, which had been duly registered, and therefore came under the regulations of the Board. The premises were in a very dirty condition, the roofs were out of repair, the ventilation was defective, and the privies had no supply of water. The houses were situated in a very densely-populated neighbourhood, and it was absolutely necessary, not only for the inhabitants of the houses in question, but also of the neighbourhood, that the sanitary works required to remedy these evils should be carried out. Mr. Layton desired to inform his worship, not with a view to prejudice this case, but as a matter of fact, that during last year the district was visited with cholera, and the Board had determined to put in force the Acts of Parliament, empowering the carrying out of sanitary measures, to prevent a recurrence of the disease.

Proofs having been given;

The Defendant stated she had not the means to pay for putting the houses into repair. She admitted what had been stated was true.

Mr. Benson, the magistrate, said the regulations and the Sanitary Act were necessary for the public health; but this being the first case before him, and seeing that the defendant was but a poor woman, he should only inflict a penalty of 5s. and costs, or seven days' imprisonment; but if the defendant was brought before him again he should be obliged to enforce a much heavier penalty.

CHURCH-BUILDING NEWS.

Llangollen.—The parish church has been reopened after restoration and enlargement at a cost of 3,097*l*. Mr. Pountney Smith was the architect employed, and Messrs. Roberts & Co., of Llangollen, were the contractors. On account of the growing wants of the town, additional church accommodation was much required. It was decided to duplicate the old north aisle by one on the south, and, as the site allowed of it, to extend the building eastward. This has been done, forming a spacious chancel, aisles, and vestry, the total area added being 2,734 ft., out of a total of 6,403 ft. superficial; and, although the western gallery has been removed, doubling the accommodation. The new buildings have been erected wholly of local and Ruabon stone, &c., in a style intended to harmonize with, though not copy the fifteenth-century work of the old church. The fittings are wholly of oak. The tower has been opened, and a western door added, giving a view of the church and chancel. The tower and north porch require considerable outlay to make either worthy of the new work. In making so extensive an addition to the parish church the parishioners have had to contend with expensive operations in the grave-yard. A vast accumulation of human remains had buried the old church several feet below the surface. This and drainage, stopping down vaults, and concreting within and without, have involved the committee in extra works.

Gloucester.—The Earl of Ellenborough is about at once to commence the restoration of the apsidal chapel in Gloucester Cathedral, commonly called St. Paul's Chapel.

Burwash Common.—The new church of St. Philip, Burwash Common, has been consecrated by the Bishop of Chichester. St. Philip's consists of a nave, north and south aisles, chancel, south porch, and a vestry at the north side of the chancel. The chief characteristic is simplicity. The style is First Pointed. The chancel is apsidal, and has simple lancet windows. There are three windows facing the east, and these have been filled with stained glass by Mr. Bailey, of London. The nave is separated from the chancel by an arch, and from the nave by an arcade of three arches. The roof of the church, which is of timber, and open, is supported by pillars of granite, and the pavement is constructed of local tiles, while on the gable, between the nave and the chancel, there is a bell-cot. The walls are built of native sandstone; they are unplastered. The church will seat about 250 persons. The architects were Messrs. Slater & Carpenter, of London. The builders were Messrs. Baldock & Brooker, of Hurstgreen; and the clerk of the works was Mr. E. Piper, of Robertsbridge. All the stonework was executed by Mr. Balcombe, of Ticehurst.

Danbury.—The ancient parish church has been restored and re-opened. Mr. Scott supplied the designs, and Mr. Saunders, of Maldon, was the builder employed. Mr. Chapple acted as clerk of the works. The south aisle has been extended 4 ft. 3 in., and a new north chancel-aisle added. The chancel-stalls have been shortened, lowered, and pierced. In the course of the alterations the ancient roof was discovered, and has been made use of to roof part of the restored building; and the ringing-platform is now above the tower-arch. The whole of the seating is in Riga wainscot, at a cost exceeding a thousand pounds. The carved poppy-heads and elbows, as also the altar-table and lectern, and the other carvings were done by Messrs. Farmer & Brindley. The facing of the east part and west end is of pudding-stone and cement: a great part of this stone has been gratuitously supplied by Mr. J. Oxley Parker. The total cost of the restoration will be about 3,780*l.* The church will now seat about 648 people.

Wath.—At a meeting of the committee for effecting the church restoration, it has been decided to instruct Mr. Hadfield, the architect, to accept the tenders of Mr. J. Rodley, mason and builder, Sheffield, for the mason's work; and Mr. Hayball, joiner, Sheffield, for the joiner's work, the tenders amounting together to about 900*l.* It was also resolved to postpone the letting of the plumbers' and glaziers' and painters' work for the present.

Westminster.—Arrangements are in progress for the erection of a new church in Westminster for the accommodation of a new district to be formed out of the parish of St. James's, Piccadilly. It is to be hoped that a site may be obtained for the edifice either in Great Marlborough-street or its immediate neighbourhood, and meanwhile a temporary church has been opened in the southern end of the old Pantheon.

Kirby Lonsdale.—Lord Kenlis, son of the Earl of Bective, has undertaken to defray the entire cost of restoring the parish church of Kirby Lonsdale. It is estimated that the work will cost more than 6,000*l.*

Liverpool.—We hear that a gentleman is about to erect, at his own cost, a church in Parliament-fields, Prince's Park-road, nearly opposite the Greek church now in course of erection.

DISSENTING CHURCH-BUILDING NEWS.

Braintree.—The chief stone of a new Wesleyan chapel has been laid here, in the Payne-road. The new building, which will be in the Gothic style, with tower, at a cost of 1,325*l.*, is to be erected by Messrs. Parmenter, of Bocking, from designs by Mr. Frederick Barnes, of Ipswich. The ground cost 250*l.*, and it was originally intended to erect Sunday-schools in contiguity to the chapel, but it being found that this would interfere with the proposed dimensions the idea was abandoned. The building is of red brick, with Caen stone dressings, and will consist of nave and transepts, with tower and spire at the north-west angle. The vestry and offices are at the back, with entrances from the minister's house. Internally the roofs will be of open timber, with carved ribs and braces. The fittings will consist of open benches and yellow pine, the whole stained and varnished. The building when completed will accommodate about 400 persons, with facilities for extending the accommodation to 650 persons.

Middleton Cheney.—The memorial-stone of the new Wesleyan chapel, in this village, has been laid. The old chapel being inconveniently small, the new one is being built near the Baptist one, in Queen-street. It will be of brick, with pointed arches, and a porch fronting the street. The contractor is Mr. Kimberley, jun. It is also proposed to erect a school.

Bristol.—A new Congregational chapel and school-rooms have been commenced in Stapleton-road. The chapel will be in the Italian style, with the principal entrance from Stapleton-road, and will provide seat-accommodation for between 900 and 1,000 people. At the end of the chapel will be the minister's and deacons' vestries, and behind the chapel are to be the school buildings, which will have a frontage in a new street from Stapleton-road to Pennywell-road. The cost, including fittings, but exclusive of land, will be, for the chapel and vestries about 2,300*l.*, and for the school and class-rooms, 1,200*l.* The architect is Mr. Hans F. Price, of Weston-super-Mare; and the builder, Mr. James P. Stephens, of Bristol. We understand Messrs. Hall & Sons, of Broadmead, have promised the glass for the buildings, and Mr. Barrett, of Bristol, to do the glazing, free of expense. The sum of 823*l.* 15s. 11½d. has been already contributed or promised.

WINCHESTER DRAINAGE.

A SPECIAL meeting of the Local Board of Winchester was held on the 17th inst., when the General Purposes Committee presented their report, recommending that the first premium be awarded to the author of the scheme No. 7, bearing the motto "Experience;" and that taking into consideration the decided opinion of Mr. Botham, relative to Nos. 1, 5, and 11 plans, no premium be awarded to the authors of these plans. After a long discussion, the report of the committee was adopted by the Board.

The author of the successful plan is Mr. James Lemon, C.E., of Southampton. Mr. Lemon is now carrying out the main drainage of that town.

Books Received.

Sussex Archæological Collections. Published by the Sussex Archæological Society. Vol. xix. Bacon: Lewes.

THE new volume of the Sussex Archæological Collections maintains the character of the series and the society. Amongst the contents will be found Notes on the lost Towns of Northeye and Hydneye, an illustrated account of Ote Hall, one of the Sussex manorial residences; and Fact and Legend concerning Harold. An account is given of the Punishment of Pressing to Death at Horsham in 1735, which is thought to be the date of the last infliction of this dreadful punishment in England. How recently we were barbarians! The account of Slindon Church includes particulars of the coloured decorations it presented.

VARIORUM.

"THE Theories of Copernicus and Ptolemy." By a Wrangler. London: Longmans, Green, & Co. This is an ingenious piece of "wrangling," showing what can be said on both sides of a no longer moot question, and especially on behalf of the Ptolemaic side. Even the revolution of the whole starry system round the earth's axis in twenty-four hours does not daunt the Wrangler, but he does not attempt to incorporate this tremendous idea with the revolution of the self-same starry heavens at one and the same time round the axis of Jupiter in eight or nine hours, and round the other planets at their respective and varying rates of rotation, so far as they are actually known, like Jupiter's. Of course, on the Ptolemaic system, we must close our eyes to the known and actual rotations of all other planets, as well as the earth's, or rather we must not regard our little bit of dirt as one of these planets at all, but as the self-sufficient centre of the whole universe. The organ of cosmical self-esteem, were there any such organ in the Wrangler's brain, must be "very large," did he really desire to uphold the Ptolemaic theory in the face of the Copernican; but it is only justice to him to repeat that this is merely an ingenious piece of argumentative wrangling, and that the author makes out a very feasible case for Ptolemy.

Miscellanea.

THE MONT CENIS RAILWAY.—A correspondent, two days ago, wrote;—"The Paris papers give the news of an accident on Mr. Fell's railway over Mont Cenis, by the awkwardness of the breaksman. The carriages, &c., it appears, went over a precipice at a curve, the velocity having been too great." There has been no confirmation of this statement, so we conclude it was erroneous.

MEMORIAL OF A LORD MAYOR OF LONDON.—According to the *City Press*, the North London Railway, in making the approaches to the terminus in Liverpool-street, removed a brick wall in which was a stone with the following inscription:—"*Thomas Rowe, miles, cum prætor esset Londinensis, hunc locum reipublicæ in usum publicæ sepulturæ communem suo sumptu dedicavit. Anno Domini* 1569." The wall enclosed a considerable space, on which the terminus now stands, but which previously had been used as a garden to some houses contiguous. A parish charity was annually distributed within the walls up to two or three years back, the gifts being supposed to be dispensed over a tomb, the ground having been once used as a burial-place, for which purpose the tablet records its dedication. Previously to 1569 the site was boggy, swampy, and ill-drained. The railway company removed an immense quantity of bones in digging for foundations.

QUANTITIES: THE HERTFORD UNION WORKHOUSE.—Last week, in our notices to correspondents, we stated in reference to a letter complaining of the architect's refusal to allow the quantities to be taken out by a surveyor who was named, that the evidence that the architect was wrong was not very clear. The sequel seems to show that we were right. The architect, it now appears, had an agreement with the Local Board of Guardians that *he* should furnish the quantities to competing builders; and the Board have resolved, by a majority of eighteen to eight, to adhere to that agreement. The architect, Mr. Peck, had declined to allow the quantities to be taken out by Mr. Timmis, the surveyor alluded to, who had gone to various builders likely to compete, in order to obtain from them authority to take out the quantities; and Mr. Timmis had, therefore, made a stir as to the matter amongst the guardians, of his influence amongst whom he had boasted, and had written what Mr. Peck called "a peculiar letter" to him, and in fact had brought the architect up before the guardians with the view of compelling him to allow the quantities to be taken out by Mr. Timmis.

BUCKS ARCHÆOLOGICAL SOCIETY: PRESERVATION OF OUR NATIONAL ANTIQUITIES.—The Bucks Archæological Society have held their annual meeting at Wotton, one of the seats of the Duke of Buckingham. An excursion was made to Boarstall, Brill, and several other places of historical interest. The duke presided at the business meeting, in the course of which Sir Harry Verney, M.P., made some remarks on the destruction of valuable antiquities through neglect, and suggested that these remains should be under the care of local authorities, and the supervision of a responsible Minister of the Crown. The duke, in acknowledging a vote of thanks for his hospitality, alluded to this subject. He said—There are close to Buckingham, farm buildings erected in great part, by my own family, out of the destruction of most ancient Roman remains. Very curious pavements, rooms, and so on, have showed that, if the search had been made fifty or sixty years before, we might have laid open the *arcana* of a Roman house, and all its domestic arrangements, as perfectly as any preserved in Herculaneum and Pompeii. The first thing that would result from Government care would be centralization in London. I want rather to see old relics preserved in their own localities, and I really think it will be done far better by local associations calling the attention of local residents to them, than by any possible Government provision that can be devised.

HEREFORD CATHEDRAL.—The tower of this cathedral is being re-leaded, the old lead having become useless through visitors cutting their initials on it, a practice to which the dean and chapter will for the future put a stop.

HOUSE FLIES.—An American paper says that house flies may be effectually destroyed by taking half a spoonful of powdered black pepper on a teaspoonful of brown sugar, and one teaspoonful of cream: mix them well together, and place the mixture in a room where the flies are troublesome.

ELY CATHEDRAL.—Bishop West's chapel, at the south-east end of Ely Cathedral, is being adorned with an encaustic pavement, by Minton. A large monumental slab (by Field), embellished with a foliated cross and inscription in brass, to the memory of the late Bishop Sparke, is placed in the centre of the floor.

DUBLIN EXHIBITION PALACE.—The affairs of the Company are in such a condition that, at a meeting just held, the question whether the building should be sold for what it would bring was discussed. It was stated that a shareholder had offered, on the part of a purchaser, 80,000*l.* for it, but the purpose to which the buyer meant to devote the structure did not transpire. An absolute resolution to sell was not adopted, but the matter was held over.

RAILWAY MATTERS.—The Lime-street Station at Liverpool—the Liverpool terminus of the London and North-Western line—is now being greatly enlarged and improved. A portion of the tunnel is being opened up for station purposes and sidings, and several new platforms are being erected. The Lancashire and Yorkshire Company have also determined upon the widening of their passenger station at Tithebarn-street. —— The importance and practicability of a tunnel beneath the Mersey, in order to bring into more effective union the Birkenhead and Liverpool docks, has been brought before the Mersey Dock Board by Mr. Hawkshaw, civil engineer. Mr. Hawkshaw thinks that the best point for crossing is between New Brighton and Bootle, as the existing dock lines could be thus connected more easily and cheaply, while the rock at New Brighton offers certain facilities for working. He estimates that the cost, allowing for contingencies and excess of estimates, would be under one million sterling.

METROPOLITAN POOR ACT.—That important part of this Act which provides for the establishment of dispensaries for the relief of the sick outdoor poor is now about to be put in force, and intimation to that effect has been officially given to the Boards of Guardians. The following are the leading principles upon which the Poor-law Board proposes to act:—Those dispensaries must either be in separate buildings, or a suitable part of the workhouse may be set apart; but to each there must be a resident dispenser, and qualified medical officers will attend at stated hours to prescribe for, at their dwellings, such as are not able to attend the dispensaries. The medicines and appliances for these institutions will be provided by the guardians, and the establishment will be under the management of a committee to be elected by the guardians either from among themselves or ratepayers qualified to be guardians. The entire cost of these dispensaries and the medical officers will be defrayed out of the common fund to be levied *pro ratâ* over the metropolis.

THE GYPSUM MINE AT LACKENBY.—A large quantity of gypsum is now being won of excellent quality. Twenty men are employed in and about the mine, and work double shifts. The shafts,—there are two, one for air and the other for drawing the material to bank,—are about 30 ft. deep. The seam of gypsum is about 5 ft. at these works. The super-strata of the gypsum beds are a green shale and thick clay. The workings are on the Newcomen Estate. The seam of gypsum crops out for some distance along the southern shore of the Tees. The seams are very peculiar, and lie like tree-roots among the brown clay, presenting a very peculiar honeycombed appearance. In one place the tides have completely insulated the stratum, and a small gypsum island, not unlike a clumsily-made centre-table of larger dimensions than usual, has been formed. The stratum seems to rise rather sharply to the north, and has a lesser inclination to the west. Gypsum underlies the whole of the north-eastern portion of Cleveland, from Middlesbro' to Coatham, and from the base of the hills to the Tees.

INDUSTRIAL PARTNERSHIPS.—It is intended to hold in Manchester a *réunion* of the friends of industrial partnerships and co-operation, in the week commencing the 22nd instant. The proceedings will comprise a breakfast meeting, to give an opportunity for social intercourse; a conference meeting for discussion; and a demonstration in the evening, the whole being compressed into one day, the 27th instant.

APPLES AND OTHER FRUIT.—The scarcity of good apples and the desirability of cultivating apple and other fruit trees more extensively in this country than appears to have been done of late years, especially by landlords in tenants' gardens, have been a subject of discussion in the *Times*; and Mr. Roach Smith recommends the planting of railway-cuttings with fruit-trees as a very profitable scheme for adoption by railway companies. We, with others, much regret the scarcity of good fruit, especially of the apple species, and wish much that something were done to restore old times in this respect; but we still retain our objection to the shutting in of railways by trees of any kind. Where they are in cuttings that conceal the country at any rate, well and good: let profitable use be made of these; but we can conceive nothing more tiresome than the miles upon miles of tree-bordered railways along which we have had to pass on Continental railways, and we hope never to see anything of this kind in England. Railway travelling, what with cuttings, tunnels, and rapidity of passage, even in a diversified country, is quite irksome enough already.

TUNNEL DRILL.—A machine for boring tunnels, driving "adits" of mines, &c., has been brought to this country by its inventor, General Haupt, of the United States' army. The whole apparatus, which drives a hole in granite or even quartz, at the rate of nearly 4 in. a minute, scarcely occupies, it is said, more space than an ordinary umbrella-stand, and weighs less than six hundredweight. It is a mere powerful frame of steel, which stands in a universal point set in a little bed of iron, and the steam borer is capable of being turned in all directions. Though capable of being worked with the same facility by means of compressed air, General Haupt prefers steam as more economical. The centre of a very small cylinder contains the drill, which is 1½ in. in diameter, but the size of which may be nearly doubled at will. With a pressure of about 25 lb. of steam, the drill is driven forward like an ordinary piston-rod, but at the rate of from 250 to 300 blows per minute. When the drills have penetrated about 28 in., the blasting powder is used, and the drill is easily lifted over the *débris* of stone. General Haupt was the chief engineer of the Hoosac tunnel in Massachusetts.

THE IMPERIAL HOTEL, DOVER.—An important addition to the hotel accommodation of Dover has just been made. The immense building commenced by the Clarence Hotel Company some three years ago has been opened for business. The new hotel stands on a plot of freehold land, facing one side of Clarence Lawn, and commands a grand sea view. The grounds are about an acre in extent, and the house is almost surrounded by some fine old trees. The enclosure will be laid out as ornamental gardens. The building has been erected at a cost of 70,000*l.*, from the design and under the superintendence of Mr. Whichcord, architect, and its principal feature is a lofty tower at the eastern side, under which is the main entrance. The ground-floor, approached from a portico projecting from the tower, has a suite of three large coffee-rooms facing the sea. The principal one of these is 45 ft. by 30 ft.; another, 45 ft. by 22 ft., is to be devoted to the use of ladies, and it is contemplated to add a conservatory to this in the rear to lead into the gardens. Branching away to the right from the vestibule is a long corridor, from which various private saloons open, and at the end of which is situated a large billiard-room, 42 ft. by 25 ft. A stone staircase leads to the upper part of the house, where there are some rooms adapted for receptions, meetings, balls, and other public purposes. The building altogether is nine stories in height, and contains 234 rooms. At present 200 of these are open, of which 75 are bed and dressing rooms. The kitchens have all the improvements in use in similar buildings, most of the cooking being done by steam. The stoves were fitted up by Mr. Jones, of London. Lifts have been provided for lessening the work connected with the establishment.

GAS IN JAPAN.—A company is being organized in San Francisco for the purpose of introducing gas into Japan.

PRESENTATION OF WORKS OF ART TO PUBLIC ESTABLISHMENTS BY THE FRENCH GOVERNMENT. The usual report of presentations of works of art by the Ministry of the Fine Arts, on the occasion of the Imperial *fêtes*, has just appeared, and is of unusual length: the recipients include churches and chapels in sixty-four departments of France, and in Algeria; more than 200 museums, libraries, and scientific and artistic institutions in the provinces, and various public bodies and institutions.

THE INTERNATIONAL WORKING MEN'S CONGRESS.—The labours of this congress have terminated. It has not had so much of the practical as of the speculative and doctrinal in it. One resolution we may quote:—"The committee acknowledges that machinery is the most powerful means to bring about the material improvement of the working classes. But to attain this it is indispensably necessary that recourse should be had to banks of mutual credit." Working men's societies are also recommended to apply a portion of their reserve or savings-bank funds to the establishment of co-operative productive concerns.

NEED OF SMOKE CONSUMPTION IN THE POTTERIES.—No attention, it appears, has hitherto been paid to the smoke-consuming clauses of the Sanitary Act of 1866 in the Potteries, which so much require amendment in this respect. A year from August, 1866, was allowed to bring the law into operation, and it is full time now that something was done. The local authorities will have the Government authorities down upon them if they do not wake up. The Staffordshire *Sentinel* complains of their shortcomings, and points to various modes and places to show the possibility of carrying out the smoke-consuming clauses of the new Act.

ROLLING ARMOUR PLATES.—One of the heaviest armour plates ever rolled has just been prepared at the Atlas Ironworks of Sir John Brown & Co., Sheffield. The size of this slab of iron when in the furnace was a little over 20 ft. long by about 4 ft. broad, and 21 in. thick. Its rough weight was over 21 tons. It was built up in the furnace before being rolled, by five mould plates, each 3 in. thick, and one solid plate of 6 in. This mass, when reduced by intense heat to the consistency of dough, was withdrawn from the furnace, and in the course of less than a quarter of an hour was passed between the enormous rollers many times, was reduced to a compact slab of iron of a uniform thickness of 15 in., and then passed on to its bed to cool till it is fit to have its rough edges planed down to the proper dimensions. The men at work were attired in thin steel leggings, aprons of steel, and a thin curtain of steel wirework dropping over their faces like a large, long vizor. All the rest of their bodies were muffled in thick, wet sacking.

NOTTINGHAM SCHOOL OF ART.—A meeting of the subscribers and donors of this school has been held in the large Room of the Institution, to adopt and agree upon the rules and regulations for its future government. Mr. R. Birkin occupied the chair. The chairman said he was sorry there was not a more numerous attendance. He believed that one reason was, because they had a debt about them. He regretted to say that there was a great advance on the part of our French competitors: he considered they were our competitors, as it was tolerably well known that the machinery producing French lace was a Nottingham invention. He was of opinion, from what he saw in the Paris Exhibition, a few months ago—beautiful and cheap articles, whether in silk clunys, or cotton, including some of the best imitations of real lace he had ever seen, that their manufactures in Nottingham must make an effort. He took credit to himself for being a judge, and he never saw better imitations of lace made than those exhibited by the French people. Mr. Mallett said he dared venture to challenge French productions as to novelty and ability (Mr. Birkin—"And price?") As to price they had not the advantage, but there was a movement only waiting for adoption and completion—he meant the new Board of Conciliation and Arbitration—which, if carried out, would, he hoped, remove every obstacle between themselves and foreign competition. The rules of the school were resolved upon as proposed.

THE NEW INFANTRY BARRACKS AT WINDSOR.—The erection of the new additional officers' and soldiers' quarters on the recently-acquired infantry barracks site at Windsor has been commenced.

MANCHESTER TOWNHALL COMPETITION. — The instructions to the architects selected for the second competition have been issued. The sum of 250,000*l.* is named as the amount to be spent, and the designs are to be sent in by the 14th of February next.

COCKROACHES.—In *Science Gossip* for the present month is a hint from a correspondent, who says he has pretty well exterminated these pests by pouring a small quantity of common creosote, of which a gallon may be had at the gasworks for sixpence, into the crevices, and about the places in which the cockroaches usually appear. The only disadvantage is a healthy smell of gas tar.

THE HERBERT HOSPITAL, WOOLWICH.—According to the newspapers the foundations of the Herbert Hospital have given way in parts, and are being underpinned. "A deep drain has been discovered at the base of the concrete on which the hospital has been erected, and is probably the cause of the disaster." Before the building was finished we mentioned the threatened evil, and were contradicted and reproved in consequence.

MONSTER BRIDGE IN AMERICA.—The foundation stone of the great bridge across the Ohio river at Louisville, Kentucky, has been laid. The total length of the bridge will be 5,220 ft., or nearly one mile. The graded approaches will be 2,500 ft. in length, and the superstructure, consisting of iron suspension trusses, will rest on twenty-five piers and two abutments. The longest span will be 360 ft., 36 ft. longer than the longest span of the Victoria Bridge at Montreal.

STREET ADVERTISING.—The sooner a good deal of this sort of thing is put a stop to the better. Tradesmen's vans, omnibuses, cabs, hoardings, live sandwiches, — every available thing is seized hold of and plastered over with advertisements. London is bad enough in these respects, but Paris is going to outdo us in the advertising line. A Frenchman of fertile imagination has just invented the following ridiculous mode of advertising. He proposes to erect along the Boulevards, level with the lamp-posts, a number of lay figures, on which the bootmakers, tailors, hatters, shirtmakers, dressmakers, milliners, jewellers, &c., would, in return for a certain sum, have the right of showing off all they have of newest and best. The promenaders on the Boulevards could in this way judge at once of the beauty and elegance of the advertised article.

THE DURHAM AND NORTHUMBERLAND ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The members of this society have held their fourth and last meeting for the season, on the borders of Durham and Yorkshire. They met at Croft Station, and examined Croft Bridge, the inscription on which is dated 1673. Croft Church was next visited, and in it Mr. Longstaffe gave some historical information respecting the village. The architectural peculiarities of the building were described by the Rev. Mr. Hodgson. The party afterwards proceeded to Haughton-le-Sterne, where the Rev. E. Cheese invited them to luncheon. Here Mr. Longstaffe read a paper on the district. The church was then visited, and was described by Mr. Hodgson as being entirely of Norman character. The party then proceeded to Darlington, and inspected the recent restorations of St. Cuthbert's Church.

DUNN'S FIRE PILLAR.—The invention patented by H. G. Dunn, for the saving of life and property from fire, takes the shape of a letter-pillar proposed to be placed at the corners of streets or inside public or private buildings, factories, ships, or mines. At the call of fire the policeman, fireman, watchman, or other appointed person, opens the door of the box with a key placed in the handle of his rattle, and finds therein hatchet and rope-ladder; he then takes the nozzle of hose, which is also there, drawing the hose after him, which revolves from the centre of the box and is from 200 yards to 300 yards long, so that one at a cross street would serve a length of houses. Many fires might thus be extinguished at their outburst. The inventor's belief is that no engine would be required, but that the water as turned on would rise to the height required. We are not certain that the practice of the metropolitan water companies justifies that belief.

COLOGNE CATHEDRAL.—Cologne has just celebrated the twenty-fifth anniversary of the date on which the works of the cathedral were resumed. The King was expected, but did not attend, being represented by the Prince Royal. A solemn "Te Deum" was sung in the nave of the church in presence of the population of the town and the numerous members of the society which, founded in 1840 under the name of the Dombauverein, took the works under its patronage. There was afterwards a procession, and in the evening a banquet, terminated by a promenade on the Rhine.

TENDERS

For new buildings for Lewes Union. Mr. H. Currey, architect:—

Reynolds	£15,152 0 0
Myers & Son	14,677 0 0
Keeble	14,365 0 0
Howell	13,955 0 0
Hart	13,894 5 0
Kirk	13,715 0 0
Nightingale	13,484 0 0
Sawyer	13,333 0 0
Heritage & Son	13,305 0 0
Henshaw	13,301 0 0
Higgs	13,272 0 0
Simms & Martin	12,946 0 0
Card & Son	12,875 0 0
Cheeseman & Co.	12,810 0 0
Peerless	12,552 0 0
Berry	11,903 0 0
Thorn & Co.	11,733 0 0
Chappell	11,397 0 0
Perry, jun.	10,651 0 0

For Public Hall at South Norwood. Mr. J. T. Barker, architect:—

Carter	£2,300 0 0
Carter	2,250 0 0
Myers	2,200 0 0
Nixon	2,198 0 0
Henshaw	2,145 0 0
Higgs	2,065 0 0
Pollard	1,775 0 0

For alterations to the Coach and Horses, High Holborn, for Mr. Charles Shalless. Mr. Henry Roberts, architect:—

Fenn	£400 0 0
Josephs	317 0 0
Hoare & Postlethwaite	265 0 0

For alterations and additions to a house, Laurel-road, Fairfield, near Liverpool, for Mr. W. R. Allen. Messrs. Picton, Chambers, & Bradley, architects:—

W. & F. Witter	£355 0 0
Wilson	345 0 0
Black	318 0 0
Urmson	304 0 0
Okille & Morrison	301 0 0
Callie	300 10 0

For erection of house in Margaret-court, Oxford-street. for Mr. G. A. Poland:—

Sharpington & Cole (accepted)	£665 0 0

For alterations to All Saints' Church, York-street, Lambeth. Mr. R. J. Withers, architect:—

Sharpington & Cole (accepted)	£435 10 0

For alterations to Mr. Roache's premises, Pimlico. Messrs. Walford & Donkin, architects:—

Patman & Co.	£785 0 0
Newman & Mann	717 0 0
Sharpington & Cole	653 0 0
Fish	648 0 0

For farm premises at Rothwell, Northamptonshire. Mr. R. W. Johnson, architect:—

Sharman	£675 10 0
Barlow & Stanyon	668 0 0
Austin	628 0 0
Wilson	619 0 0
Barlow & Butlin	560 16 0
Haycock	493 18 0

For alterations to dwelling-house, Kettering. Mr. R. W. Johnson, architect:—

Hawthorn	£365 0 0
Wilson	352 10 0
Buswell & Henson	339 0 0

For new Temperance Hall at Finedon, Northamptonshire. Mr. R. W. Johnson, architect:—

Whittering & Wallington	£974 0 0
Watkin	900 0 0
Wilson	888 0 0
Barlow & Co.	886 0 0
Perkins	826 0 0
Henson	797 0 0

For new schools at Finedon, Northamptonshire. Mr. R. W. Johnson, architect:—

Watkin	£690 0 0
Wilson	665 0 0
Barlow	665 0 0
Henson	660 0 0
Whittering	639 0 0

For additions to farm premises at Barkley Thorpe, near Leicester:—

Halliday & Cave	£1,415 0 0
Fast	1,310 0 0
Herbert	1,199 0 0
Osborne	1,183 0 0
Neale & Sons	1,122 10 0

For additions and alterations at 50, Westbourne-grove, for Mr. C. Stafford. Messrs. Newman & Billing, architects. Quantities not supplied:—

Ware & Jouel	£585 0 0
Phillips	578 0 0
Wicke	545 0 0
French (accepted)	537 0 0

For alterations to the "Dover Castle," Great Dover-street, Borough. Mr. W. A. Murphy, architect:—

Sharpington & Cole (accepted)	£115 0 0

For house, stables, and lodge, at Clapham Park. Mr. Notley, architect:—

	House.	Stables.	Lodge.
Colls	£4,700	£620	£220
Macey	4,696	596	201
Turner & Sons	4,424	600	223
M'Laglan	4,359	606	213
Hart	4,310	582	198
Newman & Mann	4,055	578	242
Myers	4,696	579	196
Webb & Sons	4,097	550	200
Browne & Robinson	4,067	534	183

For new Receiving Wards at the Industrial Schools, Forest-lane, West Ham. Mr. John Hudson, architect:—

Worskett	£4,850 0 0
Adams	4,760 0 0
Shawman	4,695 0 0
Sheffield	4,637 0 0
Garrud	4,617 0 0
Smart & Co.	4,455 0 0
Knight	4,383 0 0
Hall	4,369 0 0
Shaw	4,369 0 0
Johnston	4,300 0 0
Abrahams	4,295 0 0
Tanatt	4,197 0 0
Rivet	4,133 0 0
Lockeby	4,077 0 0
Langmead	3,990 0 0
Poxon & Co.	3,990 0 0
Blackmore	3,952 0 0
Nutt & Co.	3,950 0 0
Morter	3,738 0 0
Hill & Keddell	3,694 0 0
Henshaw	3,687 0 0
Webb & Sons	3,684 0 0
Goshawk	3,520 0 0

For stabling at St. John's-wood, for Mr. H. C. Newton. Mr. W. A. Baker, architect. Quantities furnished by Messrs. Richardson & Waghorn:—

I'Anson	£849 0 0
Abbott	767 0 0
Kelly	759 0 0
Manley & Rogers	737 0 0
Mann	729 0 0
Browne & Robinson	697 0 0

For alterations and additions to Claydon Parsonage, Oxon. The incumbent to provide stone, sand, and hauling. Mr. Edwin Dolby, architect:—

Waller	£307 0 0

For a house and smithy at Cowley, near Exeter, for Mr. Thomas Blackall. Mr. Edwin Dolby, architect:—

Woodman	£230 0 0
Mitchell	227 0 0
Stevens	226 0 0
Godbeer & Coles	219 14 11
Inch	207 13 0

For boundary walls to the new vicarage, Abingdon, Berks. Mr. Edwin Dolby, architect:—

	Brick wall.	Cleft Oak Fence.
Selby	£224 0 0	£110 0 0

For alterations at 15, Bridgewater-square, for Mr. C. Berg. Mr. Thomas J. Hill, architect:—

Moreland & Burton	£765 0 0
England	749 0 0
Perry (accepted)	568 0 0

For a manufactory, Norman's-buildings, St. Luke's, for Mr. R. Shephard. Mr. Thomas J. Hill, architect:—

Moreland & Burton	£3,398 0 0
Page	3,220 0 0
Taylor	3,150 0 0
Aniey	2,725 0 0
Perry	2,675 0 0
Sabey	2,390 0 0

For works at Tottenham, for Mr. W. Robinson. (Second contract.) Mr. Thomas J. Hill, architect:—

Pattman, Brothers	£948 0 0

For a country inn, with stabling, offices, and smithy adjoining, proposed to be built at Clewer, for Sir Daniel Gooch, bart., M.P. Mr. William Sim, architect:—

	Inn, with Stabling.	Smithy.
Kelly	£899 0 0	£109 15 0
Fish	850 0 0	112 0 0

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